Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone and Sound Waves
PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY. MONADNOCK BLOCK. CHICAGO

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INDEX TO ADVERTISEMENTS, PAGE 46
CLASSIFIED ADVERTISEMENTS, PAGE 45

CHICAGO, NOVEMBER 16, 1912

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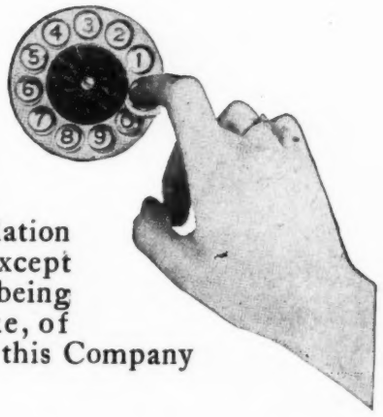

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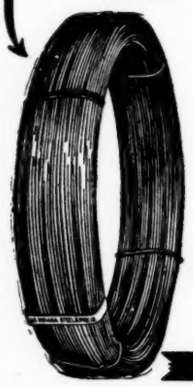

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THE WORLD'S GREAT WORK.

It is commonly supposed that the great work of the world is done by the world's noted men—its captains, inventors, teachers and financiers. Not so. It bulks too large to be the work of the few, and so is distributed in small stents among the hands of the many. The low-waged man, being the real producer, is the real king. He is not tolerated, but NEEDED. He has a right to move among his tasks with dignity and assurance. His prime responsibility is to himself—to fill his little niche as a man should fill it, to do his work with skill and honor, not as a drudge, but as a faithful servant of the interests of mankind.—Richard Wightman.

More Evidence of Permanent Prosperity.

The election over, business men are looking about them and are scarcely able to credit the fact that no disturbance has resulted. The pre-election indifference to politics continues without change, a condition so rare as to excite interest. Our prosperity is evidently so firmly established that business continues to play its own game and gives but an indifferent glance at politics.

Dun's Review for the week says: "Business confidence survives the unprecedented political struggle unperturbed, and the outlook is made brighter by more favorable developments in the general commercial activities, transportation and agriculture. Never before yesterday's official figures have the harvests been shown so immense, and there naturally must follow a period of prosperity, not only national in its scope, but also directly stimulating the producing and distributive interests to increased efforts."

And Bradstreet's supplements this by saying: "The presidential election has come and gone with the barest possible apparent effect upon trade and industry. Neither the election itself nor its results, sweeping as they were, have thus far changed the optimistic undertone previously characterizing trade sentiment, the situation in this respect presenting one of the most notable economic phenomena of recent times."

The Security National Bank of Chicago, in its monthly circular, is finely optimistic on general business and financial conditions. "The prosperity of the country is real and the condition of business satisfactory," the circular says. "The one big handicap which remains is the scarcity of labor."

And the National City Bank, of Chicago, points out a phase of the situation which is both novel and convincing.

"A rather extraordinary indication of basic strength has been afforded," says the November financial letter, "by the ease with which the American markets have bought back the securities sold recently in Europe. Under even normally good conditions it is no easy thing for a market to take over $40,000,000 or $50,000,000 of securities within two or three weeks. But that is virtually what was done last month, and the satisfactory outcome of the operation certainly shows that there was a very general belief in the integrity of such investments, and in the prospect for continued prosperity."

So the situation resolves itself into a case of keeping hard at work to take every advantage of the present favorable conditions.

Watch the Service Association!

As reported this week, the second meeting of the Central States Telephone Service Association has been held in Chicago. Here is a new order of things which is worth watching. Not only that, it is an order of things which is deserving of the most earnest support of every company, large and small, in the field which the new organization at first proposes to cover. That this field will ultimately be extended no one can doubt.

TELEPHONY has already shown that *service* is the keynote

of the whole plan. Telephone *service* is the thing today which the public demands, which demand it is backing up by the formation of public service commissions in state after state, with the primary idea of obtaining good service at reasonable rates. The time has passed when the public will be content with irregular or intermittent telephone service. It has become educated to a point where it regards the telephone as a necessity and the best service possible an absolute essential. The barbed-wire line lives now, for the most part, only in reminiscence.

How may the smaller company, in particular, keep itself up-to-the-minute in this respect? The larger organizations are able to employ competent engineers, who pass understandingly upon every problem presented to them. The small company cannot afford this. It is dependent upon rule of thumb methods, haphazard advice (often erroneous), or manufacturers' booklets. The latter have unquestionably come to speak with authority upon telephone matters in general, but there are constantly arising questions which are not specifically dealt with in these leaflets, where rule of thumb practice fails, and where the gratuitous advisor is helpless.

This is where the Service association enters. Through its three main standing committees, engineering, traffic and commercial, it will answer, for its members, all questions submitted to it. It goes farther and proposes to submit helpful suggestions from time to time along all lines.

The cost of this expert service—for every committee is made up of experts in their respective lines—is so low as to be absurd. One call upon any one of the committees and the ensuing satisfactory solution of a service problem might easily be worth ten times and more its cost to any company. For example, a concern operating, say, 150 telephones, and with 20 miles of toll line, would pay the association annually one cent per station and one cent per mile of toll line, or a total of $1.70. What expert would even trouble to glance at an inquiry with so low a fee in sight as this? And yet this company, if a member of the association, may have a dozen problems solved for it.

For the larger corporation, the benefits may, at first sight, seem doubtful. And yet by joining forces with this association, the large company will set a worthy example, to its smaller connecting lines and thereby cement still closer the common bond between them, bring about a perfection of their systems and methods of operation, producing more satisfactory service for its own subscribers, as well as for those of the connecting companies. Who shall say in such a case that the few dollars thus expended were not a most profitable investment?

Service is the reinforced concrete foundation of modern telephony. Anything which promotes betterment of service makes for the advancement of the science, for the more complete satisfaction of subscribers and for increased profits. By enlisting in the ranks of the Service association, therefore, you advance the best interests of the business, of your subscribers and of your stockholders. Let every company in the central states field give the question of membership the thoughtful consideration it so fully merits.

Increasing the Revenue.

W. S. Vivian, secretary of the Michigan Independent Telephone & Traffic Association, of Grand Rapids, Mich., is well known to TELEPHONY's readers as an expert traffic man, as well as a thoughtful and forceful exponent of modern methods in Independent telephony. In our judgment, Mr. Vivian has never appeared to better advantage, nor has he spoken more thoughtfully and forcefully, than he did this week, at the second meeting, in Chicago, of the members of the newly organized Central States Telephone Service Association.

What he had to say to them and, through the columns of TELEPHONY, to every telephone man in the business, is presented in full on other pages in this issue. Every word should be carefully read and as carefully considered by the managers of telephone properties everywhere. Some of the truths Mr. Vivian has elucidated may be unpalatable, but they are, none the less, truths.

Mr. Vivian is every inch a telephone man. He believes there is no better business on earth than the telephone business. He is, if not by birth, at least by training, an Independent telephone man. He is looking always to the "good of the order." He took as his subject in this talk, "Revenue." And he showed with astonishing clearness how the revenues of Independent telephone companies are almost universally held down, partly through a lack of system and partly because "co-operation" is more of a catchword than it is a reality.

Co-operation.

There are probably several score of ways in which Independent companies may co-operate to their mutual advantage. A new method has been pointed out to us this week. The matter of rates has always been a live issue. Hundreds of Independent companies, building their systems and basing their calculations upon what the Bell company was doing when operations began, have found the demand for their service increase so far beyond what they had figured on that, in order to make a fair percentage on their investment, they have been compelled to raise their rates.

Considering the circumstances which gave birth to the Independent movement, this is not at all to be wondered at. It is the logical outcome of certain conditions, which could not possibly produce any other result. A case of this kind excites no comment except in the particular community involved. There, however, a vast amount of argument and explanation is often necessary to demonstrate a perfectly simple proposition.

The Columbia (Mo.) Home company was called upon by the city council a short time ago to demonstrate its need for charging the rates it has established. It immediately turned to its sister corporations throughout the adjacent territory for evidence to substantiate its argument. The manner in which this was done is shown elsewhere in this paper. There is no reason to doubt that the response was instant and satisfying. The plan is recommended to other companies similarly situated, and which are cited to give a reason for the faith that is in them.

New $300,000 Minnesota Iron Range Company Formed

Range Telephone Co., Backed by Tri-State Officials and Strong Local Men, Is Organized to Install Modern Telephone Service in One of the Richest Sections of Minnesota—Construction Will Probably Not Be Undertaken Until Next Spring

The Range Telephone Co. has been incorporated under the laws of Minnesota, with a capital stock of $300,000, to build an Independent system throughout what is known as the Iron Range, in northern Minnesota. The headquarters will be at Virginia.

The company has an exceptionally strong array of officers and directors, including some of the most prominent and wealthy business men in the territory. The officers are as follows: President, A. C. Osborn, proprietor of a large and successful iron foundry and machine shop, Virginia; vice-president, C. H. Rogers, general superintendent of the Virginia & Rainy Lake Lumber Co., Virginia; secretary, Adelbert Trotter, chief saw filer, Virginia & Rainy Lake Lumber Co., Virginia; treasurer, Mark Elliott, superintendent of the Interstate Mining Co. and others, Virginia.

The directorate includes the foregoing and J. S. Lutes, owner and manager of the Biwabik Mining Co., Biwabik; Thomas A. Flannigan, mine superintendent, Gilbert; A. J. McCulloch, Duluth; J. C. Crowley, Jr. general manager of the Peoples Telephone Co., Superior, Wis., and special agent of the Tri-State Telephone & Telegraph Co., of St. Paul and Minneapolis; and G. W. Robinson, vice-president and treasurer of the Tri-State company.

Besides these, there were named among the incorporators of the Range Telephone Co. F. S. Colvin, of the Colvin-Robb Lumber Co., Biwabik; P. R. Vail, president of the Virginia Brewing Co., Virginia; H. O. Johnson, of Osterberg & Johnson, iron foundry and machine shop, Virginia; Andrew Grande, contractor and wholesale builders' supplies, Virginia; W. B. Shaver, contractor, Virginia; and C. E. Hendrick, superintendent of the M. A. Hanna mines.

Of the $300,000 capital stock, $200,000 is preferred and $100,000 is common. The preferred stock has no voting power, but is preferred as to dividends, which are to be 7 per cent., not cumulative. It is also preferred as to distribution of assets in the event of the dissolution of the business. The par value of the shares is fixed at $10.

The Range Telephone Co. has been organized to enter a field which has been for many years without competition in the telephone business. Industrially it is one of the richest producing territories in the Northwest, including, as it does, large iron mine properties of the United States Steel Co., as also of some of its chief competitors. In addition, there are many other important industries, such as lumber, which center in this section north of Duluth, and which aggregate an annual production of tremendous value.

As is indicated, the Tri-State interests are well represented on the board and, as soon as the system is completed, connections will be immediately established with the Twin Cities. A large amount of long distance business is transacted between this field and Minneapolis and St. Paul, via Duluth, which is now handled by the Bell company. The Independents, however, have strong systems in both Duluth and Superior, with excellent long distance connections with the Twin Cities, so that comparatively little construction of this character will be necessary to perfect the through service.

The procuring of franchises in the various towns in which the Range company proposes to operate will now be at once actively taken up and it is expected that actual construction will be commenced as early in the spring as climatic conditions will permit. The new company is launched under the happiest possible conditions.

Fayette Home, of Lexington, Kentucky, Buys Out Bell

Independent Company Concludes Arrangements with Cumberland Bell to Take Over all its Properties in City of Lexington and Counties of Fayette and Woodford—To be Accomplished by Exchange of Securities—Bell to be Represented on the Directorate

Negotiations that have been pending since last April for the consolidation of the Fayette Home Telephone Co., of Lexington, Ky., and the Cumberland (Bell) Telephone & Telegraph Co. have been closed by a proposition made by the Cumberland company, and approved by a committee of the board of directors of the Fayette Home, for the sale of all the property of the Cumberland in the counties of Fayette and Woodford to the Fayette Home Telephone Co.

This proposition, which has now been agreed upon in its final shape at a meeting of officers of the Fayette Home and the Cumberland, in Atlanta, must be ratified by the board of directors of the Lexington company, and approved by the Railroad Commission. Both proceedings are regarded as purely formal and assured.

According to the terms the Fayette Home will purchase all the property of every kind owned by the Cumberland company in the counties of Fayette and Woodford, except the switch board in the exchange at Lexington and the long distance toll lines beyond the city limits of the city of Lexington, and beyond a radius of a mile and a half of the Cumberland exchange in Midway.

The long distance lines of the Cumberland will be run into the exchange of the Fayette Home company, which will also maintain the connections with the Independent long distance lines which it now has.

The management will remain as it is at present. Three representatives of the Cumberland company will be elected as directors of the Fayette Home.

The Lexington Herald, after detailing the transaction, says in part:

"In these negotiations representatives of the Cumberland company, including N. C. Kingsbury, vice-president of the American Telephone & Telegraph Co., evidenced the spirit that has controlled the Bell interests since Mr. Vail became president of the A. T. & T. Co.—recognizing the broad obligation that the Bell Telephone Co. owes to the public to render efficient service, to extend its lines as the public demands require, to render prompt, courteous and efficient service at reasonable prices.

"It has heretofore been a most rare, if not unknown,

course for the Bell interests to sell their property at any point. Heretofore those interests have attempted to maintain an exchange, no matter what the local conditions might be, having pursued the policy of extermination, either by purchase or by competition, of all Independent interests.

"Under the wiser course now dominant in the Bell companies, as exemplified by the negotiations conducted by Mr. Kingsbury and Colonel W. T. Gentry, president of the Southern Bell, and also of the Cumberland, they recognize that the first and prime requisite of a telephone company is that it shall render extensive and adequate service. Therefore under the conditions existing at Lexington they made the proposition to sell their plant, take payment therefor in the securities of the Fayette Home Telephone Co., and unite with the Fayette Home in maintaining a high standard of local service, and extending the long distance service."

When asked for a statement in regard to the reported purchase and sale, George S. Shanklin, president of the Fayette Home Telephone Co., said, in part:

"There has been for a long time a public demand that there shall be a physical connection or consolidation between local telephone companies doing business in this community. This feeling has prevailed all over the United States and it was crystallized in Kentucky by the passage of the Thomas-Schoberth Bill in the legislature of 1912, which provided for the physical connection and interchange of messages and business between telephone companies, and also by the Wilson Bill which provided for the consolidation of exchanges.

"Sharing the prevailing feeling and in deference to it, the management of the Fayette Home Telephone Co. has been negotiating with the Cumberland Telephone & Telegraph Co. for physical connection and interchange of business, and has finally reached an agreement which will provide for the consolidation of the two exchanges in the city of Lexington and Fayette county and their operation by the Fayette Home Telephone Co. This will greatly increase the facilities now enjoyed by the public for the use of telephones, because, with a single system and without duplication, a subscriber can have the benefit of universal service. In addition, each subscriber will now have connection with every telephone in Fayette county and the list of the Fayette Home Telephone Co. will be increased by at least 1,000 to 1,500 names.

"The management of the Fayette Home Telephone Co. will remain with local people, who have the interest of the community at heart, and who may be expected to do everything possible to build up and perfect the service."

This is the largest transfer of Bell properties to an Independent corporation since the Lincoln, Neb., division of territory, accomplished in the early part of the year.

Commission Fixes Rates in Arizona.

Publicity has been given to an order of the Arizona state Corporation Commission fixing telephone rates to be charged by the Mountain States Telephone & Telegraph Co., particularly in and about Phoenix, where the consolidation of competing exchanges has made it necessary for the commission to order a fixed rate.

That body has adopted a standard schedule of rates for the period of one year to enable the telephone company to try them out and make proper reports of its business.

Included in the order is also a provision that no rates in the state shall exceed the standard rate as filed by the Mountain States company. Exchanges have been divided into two classes—A and B, and the commission has ordered that a rate of $2 per month for party line residence service shall be in effect in all of the A class exchanges, which includes Bisbee and Douglas, so that patrons in those exchanges may now secure residence telephones on party lines at the above rate.

This will increase the number of telephones in each exchange and will be a considerable factor in increasing telephone communication with the business houses.

The commission, in its order, has taken a vigorous stand against all discrimination and preferences and the company is required to place all patrons on the same relative basis.

In a year from now the commission will hold a hearing in each exchange in the state and definite schedule, based on costs, revenue and investments will be made.

Number of Extensions From One Trunk.

An interesting fight is being waged before the Maryland Public Service Commission over the interpretation of its own ruling in the telephone case, the question at issue being how many lines can be extended from one trunk.

In its ruling the commission states that "six lines may be extended from one trunk," but the language is such that the contention is made that more than six lines may be extended for the same charge.

The Baltimore law firm of Williams, Thomas & Williams is making the fight for more than six lines from the trunk in its office. The firm wants one additional extension, while the Chesapeake & Potomac Telephone Co. officials have balked at the request.

Henry Williams argued that there is nothing in the language used by the commission which says that more than six lines cannot be extended from one trunk line, and stated that it was unfair to compel his firm to pay $30 per annum for another trunk line when only one additional extension is desired. He said he could not see any reasonable objection on the part of the company.

The officials of the Chesapeake & Potomac argued that six extensions is the maximum for any trunk line to care for and that additional extensions would block the system.

Object to Paying for Improvements in Advance.

The patrons of the Southern Bell Telephone & Telegraph Co., at Spartanburg, S. C., have brought an action before the Railway Commission against the company. The Bell people desire to put in a new telephone system and to place the wires underground. This will entail an expenditure of approximately $150,000. In doing this they wish to assess the subscribers 50 cents on each individual telephone immediately.

The subscribers of the company demurred, claiming that the assessment should not be made until after the improvements are completed. They do not object to paying the extra assessment, but do object to doing so until the improvements are made.

The commission has not yet given its decision, but will probably do so soon.

Bell Agrees to Single Charge Following Merger.

The Wisconsin Telephone Co., upon the request of the Commercial Club, of Green Bay, Wis., has agreed to discontinue the duplicate charge of telephones on November 1. That is, where both the Wisconsin and the Fox River Valley Telephone Co.'s telephones are used in a single office or home, only one charge will be made on and after November 1.

Judge Settles Case by Use of Telephone.

The use of the telephone in taking testimony in courts is now quite a common occurence. Recently Judge Lummus of Boston, while trying a case, left the bench and telephoned to Portland, Me., to verify the testimony of Eugene W. Mitchell. Two witnesses had testified to meeting Mitchell in Boston on certain dates while he claimed to have been in Maine on a vacation at the time specified.

When he told of registering at the hotel, Judge Lummus suggested that one of the attorneys telephone to the hotel. The lawyers could not agree as to who should telephone, and so he did it himself. The judge was told over the wire that Mitchell had registered at the Hotel Falmouth in Portland, as he testified on the stand. Returning to the court room the judge discharged the defendant.

The Counter Voltage Resistance of an Electrical Current

Explanation of the Voltage of a Circuit by Use of the Pump Analogy — The Counter Voltage — Some Electrical Formulas—Methods of Calculating the Counter Voltage Resistances of Various Circuits, Showing the Application of Ohm's Law

By Arthur Bessey Smith

What is voltage? We have been accustomed to think of voltage, measure it, calculate it, and handle it chiefly in connection with dynamos and batteries. It has come to be thought of as representing the moving power, of being the measure or index of that force. It is my object to call attention to some interesting relations which will give clearer conceptions of voltage in relation to the receiving circuit as well as to the generator.

The pump analogy is very good for illustrating the voltage of a generator. In Fig. 1 let P be a piston within a pump cylinder, arranged so as to force water through the pipe in the direction indicated by the arrows. Let the valve be closed. Suppose that the pump is acted upon by an engine, so that it produces a steady difference of pressure between A and B of 100 pounds per square inch. This may be measured by a pressure gauge consisting of an elastic diaphragm in a metal casing with a pipe connecting either side to one end of the pump. The diaphragm will be pressed to the right in proportion to the pressure. If the engine were to push twice as hard, the pressure would be twice as great, or 200 pounds per square inch. Thus the pressure, as revealed by the pressure gauge, is a measure of the *tendency* to cause water to flow, produced by the engine and pump.

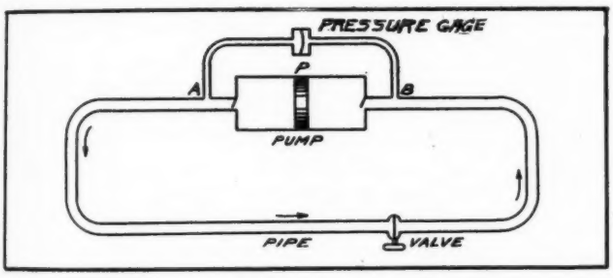


Fig. 1. Pump Analogy of Current Flow.

In Fig. 2 a storage cell is shown connected to a circuit, so that it *tends* to force current in the direction of the arrows. Let the switch be open. The cell produces a steady electrical pressure between the points + and —. The pressure may be measured by a voltmeter connected between the two points. If the cell were to have twice the voltage, the voltmeter would indicate twice as many volts. Thus the voltage is a measure of the *tendency* to cause electricity to flow, produced by the cell. It must be noticed that the voltage of a generator (water pump or electrical pump—a cell) is independent of current flow. In the cases mentioned, the pressure exists but no current flows, because the resistance is infinitely high.

In Fig. 1 let the valve be opened. The water will begin to flow through the pipe as arrowed. This is from A to B. The flow is from the point of high pressure to one of lower pressure. If the pump be perfect, having no internal friction or other losses, the difference of pressure will remain unchanged.

If in Fig. 2 the switch be closed, the current will flow through the wire in the direction indicated by the arrows, from + to —. The flow is from a point of high potential to a point of lower potential. If the battery be perfect, no internal resistance or other losses, the voltage will remain unchanged.

What is counter voltage? "Counter" means "opposite" or "against." It is illustrated in Fig. 3. Each battery is assumed to have no internal resistance and R represents all the resistance in the circuit. With the switch open, proceed to measure voltages around the circuit. That of the main battery, 20 volts, is in a positive direction (counter clockwise); cell C, 2 volts in a negative direction; resistance R, zero. It

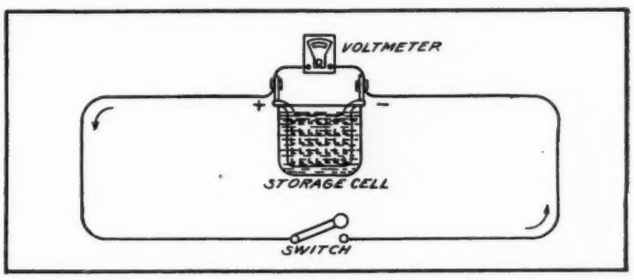


Fig. 2. Battery and Circuit.

is evident that the cell C is rightly named "counter," for it is poled opposite to the main battery. The resistance is neutral at this time.

When the switch is closed, readings may again be taken. The main battery gives 30 volts in a positive direction; cell C, 2 volts in a negative direction; resistance R, 28 volts in a negative direction. The main battery, as the source, has opposed to it two voltages, that of the cell C and that of the resistance R. Each of these may properly be called a counter voltage, for its direction is opposite to that of the generating battery. It may be compared to the reaction which a body exerts on a moving force. When a locomotive is pulling a train at a constant speed with a force of 500 pounds, the train pulls backward with a force of 500 pounds. Friction is the cause of the backward pull. Friction is similar to electrical resistance.

When Ohm's law is examined, it is observed that the voltage of a plain resistance is proportional to the resistance and current, Thus

$$e = IR.$$

In this it differs from the counter voltage of an ideal cell, because the latter is independent of the current flow, while that

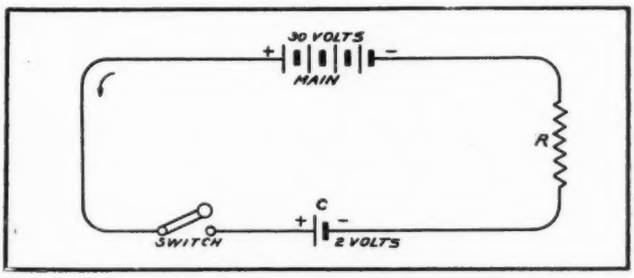


Fig. 3. Counter-Electromotive Force Cell.

of the resistance varies with the current. Nevertheless, it is a true counter voltage, being opposed to the generator.

The power consumed by the cell C is given by the equation

$$W = Ie$$

which means that the power in watts, W, equals the current, I, through the cell multiplied by its counter voltage, e. If in Fig.

3, the current be one ampere, then $W = 1 \times 2 = 2$ watts. This power is expended in work done upon the chemicals in the cell, charging it if it be a storage cell.

The power consumed by the resistance is given by the same equation, so that if the current be one ampere,

$$W = Ie = 1 \times 28 = 28 \text{ watts.}$$

This power is expended in heating the wire of the resistance

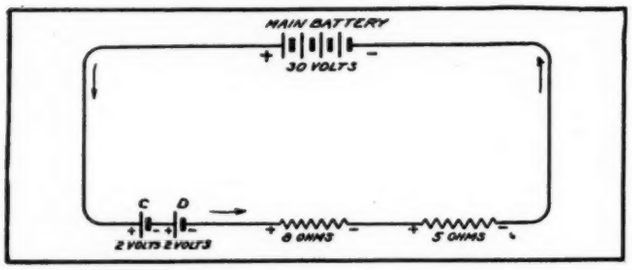


Fig. 4. Counter Voltages in a Series Circuit.

coil and is radiated as heat into the air or other surrounding medium.

Counter voltages in series are added. The action of counter voltages in series may be studied from Fig. 4. The main battery of 30 volts is furnishing current to a series of four elements, two cells and two resistances. If a voltmeter is taken and the voltage of each element is measured and its direction ascertained, the following results will be obtained:

Main battery, . .	30 volts positive.
Cell *C*, ...	2 volts negative.
Cell *D*, ...	2 volts negative.
Resistance 8 ohms,	16 volts negative.
Resistance 5 ohms,	10 volts negative.

Upon adding all the negative voltage, they are found to be equal to that of the main battery.

If the voltmeter is placed across any two of the elements, a reading equal to the sum of the two separate values will be obtained. Thus, measuring across *C* and *D* one gets 4 volts; across the two coils, 26 volts; and across cell *D* and the 8-ohm coil, 18 volts. The counter voltages in series are added, whether they be due to battery or plain resistance.

Counter voltages in parallel are equal. If the circuit of Fig. 5 is examined, it is seen that there are four paths connected to the main battery. Two of them contain battery and two are plain resistance. If the voltage across each is measured they are found to be equal, which, of course, they must be, since they are connected to the same points, *A* and *B*.

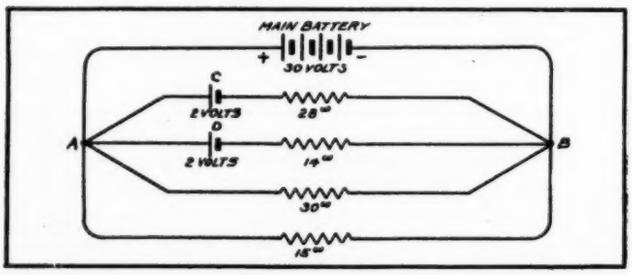


Fig. 5. Counter Voltages in Parallel or a Multiple Circuit.

If the current flow in each circuit is measured one would discover the following values:

Cell *C*, ...	1 ampere.
Cell *D*, ...	2 amperes.
30-ohm resistance, . . .	1 ampere.
15-ohm resistance . . .	2 amperes.

Now calculate the voltage across each path.

For the 15-ohm path, $E = IR = 2 \times 15 = 30$ volts.

For the 30-ohm path, $E = IR = 1 \times 30 = 30$ volts.

For the cell *D* the voltage of the resistance, 14 ohms, is added to that of the cell.

For the cell *D*, $E = IR + e = (2 \times 14) + 2 = 30$ volts.

For the cell *C*, $E = IR + e = (1 \times 28) + 2 = 30$ volts.

Thus all the paths in parallel have equal counter voltages.

The above relation is very useful in working out the current flow through one of several parallel circuits, and should replace the old cumbersome method based upon the proportion of inverse resistances. In Fig. 6 it is desired to know the current which will flow in the 8-ohm coil. The following method is simple and direct.

1. Get the joint resistance from *A* to *B*. To do this, convert each resistance into conductivity by dividing it into 1.

$$\frac{1}{20} = .05 \text{ mho.}$$

$$\frac{1}{13.3} = .075$$

$$\frac{1}{8} = .125$$

Total conductivity=.2502 mho.

Now convert the total conductivity into resistance by dividing it into 1.

$$\frac{1}{.2502} = 4 \text{ ohms, nearly.}$$

2. Get the total resistance of the circuit. Add the joint resistance between *A* and *B* (4 ohms) to that of the rest of the circuit (2 ohms), obtaining a total of 6 ohms.

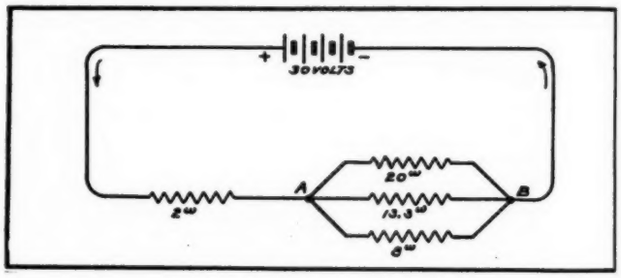


Fig. 6. Simple Current Method.

3. Calculate the total current, by dividing the voltage by the total resistance,

$$I = \frac{E}{R} = \frac{30}{6} = 5 \text{ amperes.}$$

4. Compute the voltage across the divided circuit, *A* to *B*. To do this, multiply the joint resistance (4 ohms) by the total current.

$$e = IR = 5 \times 4 = 20 \text{ volts.}$$

5. Calculate the current in the 8-ohm coil, by dividing the voltage across the divided circuit by the coil resistance.

$$i = \frac{e}{r} = \frac{20}{8} = 2.5 \text{ amperes.}$$

This method can be easily and accurately applied to a circuit containing any number of parallel paths and is free from confusing proportions. It is based upon the fact that each of the shunt paths offers the same counter voltage to the current, and the method is to discover that voltage and then apply Ohm's law.

He Served His Sentence.

A Chicago paper says that Eugene H. Smith, a former trainman, took his punishment before instead of after his arrest for intoxication recently. After celebrating the election he found his way into the La Salle street station, locked himself in a telephone booth, and then fell into a deep slumber. He was extricated by a special policeman. Municipal Judge Wells ruled that the confinement in a three-foot cell was enough punishment and discharged Smith.

The Bemis Report

The Chicago Telephone Company—Some Joys of Monopoly

By J. C. Kelsey

"After you, my dear Gaston!"

"After you, my dear Alphonse!"

This is not the funny page, but it merely represents the telephone situation in Chicago. An official of the telephone company said it was a wonderful report for a man who knew so little about the telephone business.

The expert for the city says the telephone company was simply lovely, so polite and accommodating, but he could not agree with it and would have to clip off $700,000 from its annual gross earnings.

Beneath all these pleasantries, there is a deep biting sting. The chances are that before the controversy is over, more members will be found in another Ananias Club, the recent one being disbanded.

Whether competition is preferable, where you can attend to your own business, or monopoly, where a city can look you over every five years, is a question.

I feel sorry for some great corporations. It is the hardest job in the world to conceal earnings. Nothing requires such desperate imagination as the act of defending a gold mine on the grounds of poverty.

There never was such a tempting bait for attack as the Chicago Telephone Co. It stands out as the second company in the world. It is building sky-scrapers and loaning money to its unfortunate contemporaries.

A new building is a dangerous enterprise. The Pioneer Bell company, of Oklahoma, never would have been accused of making too much money, had it not put up a beautiful white marble building in Oklahoma City.

Death loves shining marks; so do political gentlemen, seeking something to devour, like to select shining corporation marks.

I don't think any corporation would have any trouble with, or interference from, anyone if it were not for bond prospectuses and favorable stock reports.

A difficulty of this kind is a great deal like the old soldier. He wants a pension, and yet he wants to protect his family with an insurance policy. If he should send his insurance application to the pension office, he would lose. And if he sent his pension application to the insurance company, there would be trouble there.

A bond prospectus is as the insurance application. It is very optimistic, and it cleverly conceals all its heartaches and troubles.

A defense of a prospective lowering of rates is as the pension policy. It breathes of disaster and future trouble; it savors of the morgue.

I presume every individual, and corporation too, has to carry water on both shoulders. It is like serving two masters. You will love one and hate the other. In one case your property is fine when you sell; in the other, when the tax collector comes, the property is valueless.

The Chicago Telephone Co. is very lucky indeed, that its toll terminal value has not been investigated and weighed in the balance. You know how each Bell subscriber pays $9 for long distance service.

The report says that the local company pays all the expenses and gets nothing but the traditional percentage.

You remember how the St. Louis Bell got $7.10 out of a month's New York long distance business, less 4½ per cent.

We hear a great deal about "depreciation," "obsolescence" and "inadequacy." It is painful even to hear about the switchboards, 14 years old, and yet in active use.

The great engineers, Arnold and Byllesby, in their inventory, found the Chicago Telephone property worth more than all the stock and bond liabilities and depreciation reserves, too. Even the company itself, up to 1908, found that its depreciation of nearly $4,000,000 was not needed, so it capitalized it.

That is fair enough, and should have been done. At least, it is the old idea of business. But it fearfully upsets the usual pathetic plea of terrible loss due to depreciation.

In rate cases, I have heard many references to the San Francisco earthquake, the Toronto fire, the Baltimore fire, etc. The people who lost all in these disasters merely pocketed their own losses. They did not expect any one else to pay them, unless it might be an insurance company. But the Bell expert seems to feel that the telephone is different.

Another idea shines out, and that is a new one, too. You have heard of "nuisance value" and "air castle value."

The new phenomenon is "extraordinary depreciation." This modest item claimed by the Chicago Telephone Co. is $6,306,000. You would almost believe you were listening to a financial play, where stage money is handled so recklessly.

Big figures are handled very carelessly. Scrapping $3,000,000 worth of switchboard at one clip does not cause an extra heart-beat.

Chicago is going to have a subway—some day!

No one believes it but the officials of the Chicago Telephone Co. They are right on the spot with a cry of alarm. The subway will cost the subscribers to their service $2,090,000. It will cost that much because the big bore will make the company smash some ducts, cut some cables, and change them over or under the subway.

The surprising thing to me is that the subway will separate districts, just as a railroad might do a farm. A farmer certainly does not build two houses and barns in this case; he merely puts in some crossings.

But the limit of nerve is reached, when the company puts in a claim for improper location. That goes too far. For instance, the Rogers Park Exchange is too far north and should be moved at a cost of $30,000 to the subscribers. Irving Park Exchange is too far west. The growth happened to be eastward. But that will cost the subscribers $31,000.

It expects to move out of a rented building into one of its own. That will cost the subscribers $300,000.

Most companies and individuals are responsible for their own errors in judgment, and have to pay for them themselves. If your automobile ran down an innocent citizen you could not make the citizens pay for it. If you bought a lot in Irving Park and built an expensive house and made a mistake, could you get judgment from any one on earth?

What in the world does Chicago pay $500,000 to American

Telephone every year for? For insurance against the very idea of making a mistake! Yet the subscribers are charged with the mistake, too.

What in the world does the company mean by its famous "development study" and its consequent expense? Why not save this enormous expense and let the bricklayer lay out the system?

I would almost suggest an ordinance compelling telephone companies to put wheels under their exchange buildings!

The Chicago Telephone Co. certainly does deserve a square deal. It is a great concern, covering nearly 200 square miles, serving 335,000 subscribers and giving excellent service. The company has had a steady growth, and so far has seen or felt little or no obsolescence.

In early days, the company had 10,000 telephones before it made a switchboard change. The next change took place when it had 20,000. Since then it has added over 300,000 telephones without replacement of any kind.

The company for 20 years had earned an average of $50.43 per telephone. Its performance stands as follows:

Gross earnings	$50.43
Cost	34.14
Net earnings	$15.29

In 1891 the company had 9,043 stations. The station performance was as follows:

Gross earnings	$115 per telephone
Cost	66
Net	$ 49

The investment was about $210 per station, or an earning of 23 per cent.

In 1901, the company had 53,511 stations. The station performance was as follows:

Gross earnings	$78
Cost	49
Net	$29

The investment per station at this time was $175, or a profit of 17 per cent.

Now the company has 335,652 stations. The station performance is as follows:

Gross earnings	$40
Cost	28
Net	$12

The investment per station is now $91, or an earning of 13 per cent. You can't wonder that the old Bell management was reluctant to extend its service until it had to do so. It made good money and had neither competition nor regulation.

One item always disputed is the 4½ per cent. yearly payment to the parent company. This amount of about $500,000 is for the use of instruments, patents and for other assistance. The whole idea is so far fetched that it seems strange that it is not abandoned.

The parent company owns the local company anyway. The results are just the same. But its abandonment would offer less trouble in the future.

The question of transmitter, receiver and induction coil, of course, never fails to show its head. It usually results in disaster, too, because the Western Electric Co. is vigorously trying to sell transmitters, receivers, coils and all at less than $2.80. Every reader of this article knows that.

And we are further told that Bell companies buy goods 7½ per cent. cheaper than Independent companies. Further, that goods sold to Independent companies are of the insulated variety.

You can't get a shock from the Independent telephone sets, but you are exposed by the Chicago Bell telephone to every extraneous electric current.

The patent question is more or less of a jest so far. There has been so much piracy and outlawry in the use of patents, and no punishment, that I believe telephone patents are liabilities and not assets.

Besides, the Bell companies buy the Pupin coils outright. There is no royalty as far as anyone knows.

Even if the use of Pupin patents does save money, the subscribers should not be taxed for it. It is a great deal like encouraging a renter to improve your farm and then increasing the rent to him on account of it.

The maintenance and reconstruction account is an interesting one. It costs practically $2.25 per station for the removal of telephones. There is no doubt of this expense, and in many ways the company gets the worst of the bargain.

Reconstruction, or, properly, depreciation replacement, averages $2.10 per telephone. In a recent case, the Bell expert said he had never heard of a depreciation basis of $4 per telephone. He has now a chance to study the charges of the Chicago Telephone Co. on this account. I have never seen any reconstructoin charge yet that exceeded $4 per station.

It is amusing to hear the theories of the experts on depreciation. It would be fine if any company ever carried out an engineer's idea of depreciation. They have never done so yet.

Depreciation seems to be a question of policy or expediency, nothing more.

Current maintenance averaged $6.40 last year. This shows a consistent upkeep of the property. For 22 years, the average charge for maintenance, reconstruction and removals has been $12.60. This figure has brought the company, up to the present day, in excellent condition.

In 1908 this charge was	$11.25
In 1909 it was	10.25
In 1910 it was	9.00
In 1911 it was	8.00
In 1912 it was	8.50

You can see the constant tendency of permanent construction to reduce costs of operation.

The changes in the art are not the serious factor they are assumed to be. Mysterious allusion is made to a semi-mechanical board in New York. Anyway, the council need not fear that this will happen in five years. Five years is but a breath in the life of a great corporation.

It is a rule of the Keystone Telephone Co., of Philadelphia, that its reserves shall equal in cash one-tenth of the replacement value of the proprty, subject to possible replacement.

The reserves of the Chicago Telephone Co. are placed at $5,644,107. The property value is placed around $45,000,000, showing a reserve percentage of about 12 per cent. This is all that common sense dictates.

The question of working capital, cost of development, and cost of developing the business are, of course, magnified. But they are not settled yet.

On the face of it, nothing is more absurd than the allowance of $7,094,246 for developing a business, whose demand for service keeps so far ahead of the supply.

No other business in the world has such an asset in the form of people standing in line to give it orders.

It is not my purpose to be sarcastic or critical. As a general rule, I believe any telephone company in a large city is entitled to a gross earning of $40 per station. The Chicago Telephone Co. shows that it is not earning that amount.

The city expert has decreed that the company can stand a reduction of $700,000 per year, or something like $2 per telephone.

Let's quit talking in stage money figures and get down to station units.

At first blush I would say that the city's position is wrong, that the company should not have its rates disturbed. But there is a "nigger in the wood pile" and no one has observed him yet.

How much long distance business goes in and out of Chicago? What is Chicago's long distance telephone bill? What importance is attached to the value of Chicago as a terminal?

It costs the Pere Marquette Railway $1,000 a day to get into Chicago. How much does the parent telephone company pay for using the lines, depots and facilities of the Chicago Telephone Co.? That is the question!

If Chicago is getting all she deserves for the use of these terminals, then the average earning of the Chicago Telephone Co. is not too high.

The average Bell station earns $9 in tolls. Chicago's toll line bill on this average should be $3,000,000 per year.

How much of this is given to the credit of Chicago's subscribers. They are charged with all the expense at this end. It is a big question! On this point rests the justice of a change in rates.

The regulation of rates is a very serious duty. It should be handled with care. Imagination or theory have nothing to do with it. It is a case of bare figures and facts, not air castles and extraordinary items!

MORAL: Don't mix your pension and insurance applications!

Telephone Service Association Makes Further Progress

Newly Organized Central States Body Meets Again in Chicago, Adopts Uniform Operating Rules, Completes Committees and Signs on New Members—Now Fairly Under Way—To Affiliate With National Association at Annual Meet

A rousing meeting of the members of the newly organized Central States Telephone Service Association was held in the Hotel LaSalle, in Chicago, on Tuesday, at which definite forward steps were taken looking to active work in the field.

The meeting was marked by the attendance of a large number of telephone owners and managers from a wide territory in the central states, and the membership was augmented by many who had not been present at the previous meeting. J. W. Callahan, general manager of the Illinois Telephone & Telegraph Co., Chicago, and president of the association, presided.

The principal regular business of this meeting was the consideration of the report of the committee on operating rules, of which W. S. Vivian, secretary of the Michigan Independent Telephone & Traffic Association, Grand Rapids, is chairman. This committee, since its appointment, has been busy in perfecting a set of rules which should be adaptable to all companies, both large and small, in the field. And such a set was embodied in its report.

The new rules, which follow largely those adopted by the Michigan association, were approved without a dissenting vote, and were ordered printed at once. The cost of this printing and of such other preliminary expense as is required, will be prorated among the companies which have associated themselves with the movement, this assessment to be later deducted from their full membership dues of one cent per unit.

The operating rules of the Michigan association having been recently printed in full in TELEPHONY, and the changes being few, they will not be reprinted at this time. The code, however, as amended and adopted by the Service association is here given in full.

CODE.

Absent, not expected today .....N.D.
All correct.....O.K.
Anyone .....A.Y.
Anyone who can talk business .....A.B.
Appointment call.....Apt.
Chief operator.....C.O.
Cannot locate.....C.F.
Cancel .....C.A.
Circuit out of order...O.D.C.
Don't Answer .....D.A.
Discontinued .....D.S.
Get better address.....G.B.A.
Keep after.....K.A.
Leave word.....L.W.
Left telephone.....L.F.
Locate party called.....F.C.
Messenger .....M.G.
Messenger not returned.B.N.R.
No circuit available (busy circuit) .....N.C.
No telephone listed.....N.F.
Not there .....N.H.
No report to give.....N.R.
Out, expected at (time)....U.
Out, don't know when will return .....U.D.
Report on ticket No.....O.R.
Telephone busy.....B.Y.
Telephone out of order.O.D.T.
Telephone reached and looking for party.....L.K.
Try again .....A.C.
Unable to get party to talk.K.T.
Unknown .....U.N.
We have your party.....W.H.
What department.....W.D.
Will talk.....W.T.

Note—N. H. is used only in the case of calls to hotels, clubs or other public places and not in the case of calls to persons at their regular places of business or residence.

By reason of the fact that a large amount of organization work will have to be carried on at once and further because much of it will necessarily be handled in close connection with the Illinois company, the Chicago terminal, it was deemed advisable to elect a resident assistant secretary, in the person of Frank L. Eldridge, special agent for the Illinois company.

The personnel of the engineering, or plant, committee, of which B. G. Groh is chairman, was completed by the chair. Mr. Groh is chief engineer of the Illinois Telephone & Telegraph Co. The other members are Roland L. Barry, general superintendent of the Tri-State Telephone & Telegraph Co., St. Paul and Minneapolis, and H. B. Crandall, chief engineer of the Inter-State Independent Telephone & Telegraph Co., Aurora.

The commercial committee, headed by C. L. Fisher, of Pontiac, now includes E. E. Dacey, general manager of the Home Telephone Co., South Bend, Ind., and L. C. Griffitts, general manager of the Inter-State.

The traffic committee, of which Mr. Vivian is chairman, has not yet been completed. In naming these committees Mr. Callahan was governed largely by the suggestions of

the members, and at the time of adjournment Tuesday, no conclusion had been reached regarding the other two men for the traffic committee. These will undoubtedly be announced in the near future.

Two of the committees, however, are now fairly squared away for business and practical results may be looked for very shortly. One of the first moves of the plant committee will be the issuance of a brief letter, which will be designated Engineering Circular No. 1. This will be written in simple style and will set forth rules for the maintenance and operation of toll lines and will be particularly designed to aid the smaller companies. This will be prepared by Mr. Groh, and will probably be ready for distribution within a few weeks.

One of the features of the morning session was the delivery, by Mr. Vivian, of an address on the vital topic of toll revenue. This is printed in full elsewhere in this issue. Mr. Vivian pointed out the immense amount of toll business which is now allowed to go to waste. He urged the co-operation of every Independent company in the effort to wipe out this loss, showing with what facility this might be accomplished. He was listened to with close attention and roundly applauded at the conclusion.

During the afternoon session, Manford Savage, president of the Home Telephone Co., of Champaign, Ill., and president of the National Independent Telephone Association, suggested that a committee be appointed by the Service association to confer with the directors of the National association at their next meeting, in Chicago, December 9. It developed that this contingency had already been met by the operating rules committee, which had nominated F. L. Eldridge and H. D. Stroud, the latter traffic superintendent of the Illinois Telephone company, to act. The nominations were then formally ratified by the Service association.

This meeting of the National directors will be the last preceding the annual convention of the National association. It is proposed to perfect arrangements which will permit the recognition of the new association by the national body and its participation, as an organization, in the annual convention.

Mr. Savage expressed the belief that the new association offered a nucleus which might readily be developed into a movement of great and universal strength and helpfulness. He suggested, however, that one sure way to secure the interest of the small connecting lines and their applications for membership was by assembling the managers at the headquarters of the central companies and explaining the merits of the proposition to them face to face. A number of the managers present expressed their intention of doing this at once. It is believed that this suggestion will be generally adopted and that a large membership will, in this manner, be obtained among the companies which it is the especial desire of the new association to reach.

Other speakers discussed the proposed plan of the Service organization, among them being Mr. Callahan, who also briefly outlined the circumstances of its formation.

"The Illinois Telephone & Telegraph Co.," said Mr. Callahan, in part, "has had, as you know, long distance connections here for some time. We have been doing long distance business with a number of systems throughout the states of Michigan, Indiana and Illinois, and hope to have connection very soon with lines in Minnesota and Wisconsin. We have corresponded with the representatives of those companies regarding this service for several months and have had the pleasure of meeting a few of them. It was thought advisable to request the various companies with which we are connected to send representatives to Chicago to meet with us for the purpose of discussing ways by which that service could be improved. That meeting was called for the sixteenth of October and was quite well attended. After the matter had been discussed, it was thought advisable to organize this association.

"This association, you must remember," he continued, "is strictly a Service association. At no time have we thought that by its organization we would conflict in any way with any other telephone association, either state or national. But we do believe that, with the aid of the Service association in the central states, we can all improve our service and increase our business. That is the sole object of this association. We believe in co-operation, and we feel that, by getting together and discussing these matters, and providing ways and means of reaching the trouble we have had, that trouble will soon be eliminated. There is no object in view for this association other than to improve the long distance service and to increase the long distance business. If the association is to prosper, however, as I am confident it will, every member and every company's representative must always take an active interest, attend the meetings, express his opinion, and give us the benefit of his experience at all times."

The representatives of the various companies present then signed the by-laws. Provision was made for the printing of regular applications for membership and these will shortly be sent out to all interested parties. It is believed that the response will be complete and prompt.

Poor Service Under Merger.

Burlington, Iowa, is having its own troubles since competition was destroyed. A recent issue of the Post, a conservative daily in that city, says, in part:

"Lack of efficiency in telephone service is something that business men have now to contend with in Burlington. The decline in efficiency is very noticeable since the consolidation of the two companies. This inefficiency is naturally attributed by the public to a reduction in the number of workers employed at the switchboard. There also is a noticeable increase here of late in the number of individual lines reported out of order, when an attempt is made to call them up. Wever, Denmark, Augusta, and all surrounding villages are now toll stations. This change alone has added thousands of dollars annually to the coffers of the greedy company. The rate in homes is being increased steadily by canvassers who induce householders to abandon party lines."

This appears to be no uncommon experience under similar conditions and sounds no very cheerful note for advocates of "universal service."

Pennsylvania Company Prosperous.

The Petroleum Telephone Co., of Oil City, Pa., has advertised for the purchase of $2,500 of its outstanding bonds, the sinking fund having attained proportions warranting this move. This is locally regarded very favorably by financial men, who have long considered the Petroleum company as one of the Oil City's strong institutions.

The company is apparently disposed to share its prosperity with its employes, having announced that on December 1, the salaries of its operators will be increased from 5 to 15 per cent., according to the grade of service. There are about fifty young women in the company's employ at this time.

The company is progressive, as well as prosperous. It has just purchased a two-ton motor truck for the use of its construction department.

Charge Fraudulent Voting in Telephone Election.

A Sioux City (Iowa) dispatch in the Burlington Hawkeye says that five members of the board of election in the second precinct of the fifth ward have been arrested on complaints issued by the county attorney, charging them with knowingly permitting illegal voting at a special election on the issue of a merger of the local telephone systems.

A Quartet of Men Prominent in the Telephone Field

CLARENCE J. MYERS, general sales manager of the Southwestern Blaugas Co., with headquarters in Kansas City, Mo., was, until November 15, 1912, superintendent of the Kansas City Long Distance Telephone Co. He was born in Toledo, Ohio, July 3, 1881. He was educated in the grade and high schools and also took a special correspondence course in electrical engineering. From 1898 to 1902 he was head bookkeeper for the Kirk Mfg. Co., at Toledo, manufacturing brazed tubing, forgings, etc. On December 14, 1902, he came to Kansas City as auditor for the Central Construction Co., which built the plant of the Kansas City Home. Later he was auditor for other companies engaged in construction of toll lines. In May, 1904, he became auditor for the Kansas City Home, and, since April, 1905, until November, 1912, he was superintendent of the Long Distance company. Mr. Myers has been on the executive committees of the Missouri and Kansas associations for years. He is a member of the Kansas City Athletic Club.

HARRY F. FLINT, associated with the Federal Telephone & Telegraph Co., Buffalo, N. Y., was born in Naples, N. Y., July 31, 1872. His telephone career began in 1900, when he organized a company in Clifton Springs, N. Y., building a grounded line plant, which was later made full metallic. His next venture was at Manchester, N. Y., where he organized the Red Jacket Telephone Co. Since then he has bent his energies to the organization of both local and rural companies, most of which are a part of, or connected with, the Federal company. These include companies at Jacksonville, Burdett, Hector, Lodi, Ithaca, Naples, Hammondsport, Avoca, Angelica, Spencerport, Potter, Pavilion, Addison, Phelps, Richmond, Montour Falls, N. Y., and Corydon, Pa., besides many others. In short, Mr. Flint has specialized on the establishment of Independent telephone systems all through northwestern New York state and vicinity. In addition to forming local companies, he has built up the rural districts. He is a K. P. and an Elk.

CHARLES L. ZAHM, telephone engineer, was born in Tiffin, Ohio, October 2, 1873. In 1889 he became a night telephone operator, inspector and lineman for the Bell company in Ohio, later being promoted to the management of an exchange. After a year he resigned and took up construction work, building Fostoria, Wauseon and Napoleon, Ohio. In 1896 he was made superintendent of switchboard construction for the Detroit Telephone Co. and other allied concerns, continuing until 1900, installing nearly 40 exchange equipments during that time. Again engaging in engineering he built a number of plants in Ohio and Kentucky, removing to California in March, 1902, where he remained until 1906, planning over 20 plants, among the largest being Los Angeles, Pasadena, Santa Barbara and Redlands. In 1906 Mr. Zahm took up engineering work at Portland, Ore., and Tacoma, Bellingham and Spokane, Wash. From 1909 to 1911 he was engineer for the Lane interests in Washington, Idaho and Montana. He is still located in the Pacific Coast field.

EDWARD A. LINDSLEY, vice-president of the Lindsley Brothers Co., and the Western Wood Preserving Co., Spokane, Wash., was born in Sullivan, Mo., December 23, 1869. He was educated in the Tamalpais College, in California. He started in the pole business in 1896, in Menominee, Mich., before the Bell patents expired and the influx of Independent telephone companies began. A branch office was maintained in Chicago. In 1901, a branch office for the West was opened at Spokane, Wash. Mr. Lindsley was one of the pioneers in the western pole industry and in the advertising and introduction of western poles in the East. He is a member of the National Electric Light Association and the Northwestern Electric Light Association. He is also a member of the Sons of Jove, the Hoo Hoo's, the Rotary Club, Transportation Club, University Club, the Spokane Club and the Spokane Athletic Club. E. A. Lindsley and G. L. Lindsley were the organizers of the present corporation of the Lindsley Brothers Co., which specializes in western cedar poles, cross arms, etc.

Pension Fund of $10,000,000 for Bell System Employes

Huge Appropriation Made for Employes of Bell Operating Companies, as well as those of Western Electric Co, and Western Union Telegraph Co.—Provides also Against Sickness, Accident and Death—Amount Is to Be Available January 1

Announcement was made this week of the appropriation by the Bell telephone system, including the Western Electric Co. and the Western Union Telegraph Co., of the sum of $10,000,000, for the purpose of providing pensions, sick and accident benefits and life insurance for the employes. The plan, which is operative January 1, 1913, is officially outlined as follows:

A fund of $10,000,000 for pensions, sick benefits and life insurance will be available on January 1, for the 175,000 employes of the Bell system and associated interests, and their families and dependents, amounting altogether to more than a quarter of a million people.

This $10,000,000 fund will be made good from year to year by annual appropriations on the part of the American Telephone & Telegraph Co. and associated companies, and the Western Union Telegraph Co. and the Western Electric Co.

This provision is made entirely at the expense of the various companies interested, without contributions of any kind from the employes themselves. The application of these varied benefits will be strictly democratic and will be for the benefit of all employes of every rank. The plan will provide for free change of employment from one company to another, with full credit for combined terms of service.

The Bell system and associated interests provide employment for about 175,000 people; of this number 130,000 are employes of the Bell telephone system. The total yearly pay for the whole group is about $115,000,000, something over $80,000,000 being paid out in wages by the Bell telephone system alone.

The terms by which provision is made for the needs of age, illness, accidents and death, may be summarized as follows:

Pensions: Male employes who have reached the age of 60 years and who have been 20 years or more in service, may retire on pensions. They may be retired at the option of the company when they have reached the age of 55 years and have been 25 years or more in service. The pension age of female employes is in each case five years younger than that of male employes. Any employe who has been 30 years in service, regardless of age, may be pensioned on the approval of the president of the company.

The amount of the pension is automatically based on the years of service and the amount of pay, and will be 1 per cent. of the average annual pay for 10 years, multiplied by the number of years of service. Therefore, a man who had been 30 years in service would get 30 per cent. of the average salary which he had been receiving during his last 10 years of service. No pension will be less than $20 a month.

Accident Disability Benefits: In the case of accidents occurring in and due to the performance of work for the company, the employe will receive for total disability full pay for 13 weeks and half pay for the remainder of disability, up to six years.

If the disability is temporary, he will receive full pay for 13 weeks and half pay until able to earn a livelihood, not exceeding six years.

Sickness Disability Benefits: Employes who are disabled by sickness or accident outside of the regular course of duty after 10 years or more in service, will receive full pay for 13 weeks and half pay for 39 weeks; if from five to 10 years in service, full pay for 13 weeks and half pay for 13 weeks; if from two to five years in service, full pay for four weeks and half pay for nine weeks. In the case of employes who have not been two years in service, heads of departments will be permitted the same discretion as heretofore, in continuing pay during temporary illness.

Life Insurance: In the case of death resulting from accident in and due to performance of work for the company, an insurance amounting to three years' pay, will be paid to the dependents of the employe, the maximum payment being $5,000.

In the case of death resulting from sickness or from accident outside the business, the payment will be one year's pay for employes who have been 10 years or more in service, and one-half of one year's pay for employes who have been from 5 to 10 years in service, the maximum payment being $2,000.

General: If any state statutes provide for more liberal compensation than is provided under the benefit plan, the statutory provision will prevail. Where the employes have legal rights, as in some accident cases, they will have the option of exercising such rights or accepting the company's benefits.

The American Telephone & Telegraph Co. has set aside from its surplus a fund which provides for those whom it directly employs, and also provides a reserve, upon which, under certain conditions, the associated companies may draw. This fund is supplemented by funds set aside by each company. The total appropriations will aggregate something more than $10,000,000. The benefits, it is estimated, will cost annually about $1,000,000 more than the present payments on this account.

The administration of the funds will be in the hands of employes' benefit committees of five, to be appointed by the board of directors of each company.

The employes' benefit committee of the American Telephone & Telegraph Co. will have general jurisdiction over the plan for the entire system and specific authority as to the American Telephone & Telegraph Co.'s employes' benefits.

Quick Court Action Over Telephone.

The telephone came into play in securing quick court action in Chicago a few days ago. A man arrested too late in the day to give bail in court was handcuffed and was about to be taken to the county jail for the night when his mother interceded by telephone, offering to give her house as security for her son's release. With the district attorney's approval arrangements were then made over the telephone with the judge for the acceptance of the bail and the prisoner was released.

New York Bell Bonds Listed in Boston.

New York Telephone Co. $5,000,000 first and general mortgage 4½ per cent. sinking fund gold bonds, dated October 1, 1909, and due November 1, 1939, have been listed on the Boston Stock Exchange.

Rock Island Election Next Month.

The popular election to determine the granting of a franchise to the Tri-City Automatic Telephone Co., in Rock Island, Ill., has been set for December 10.

Election Returns Distribution a Good Advertisement

Two Independent Companies, the Tri-State, of Minnesota, and the Illinois, of Chicago, Make Excellent Capital for Themselves With Their Subscribers by Effective Handling of Reports at Recent National Election—Public's Appreciation

Since the beginning of competition in the telephone business the public has been schooled to expect considerable of the operating companies in the nature of general information, originating in a desire to advertise their service, looking towards increased subscriptions.

This free service has grown from requests by local subscribers for the correct time of day, the time of arrival and departure of trains, etc., to detailed reports from the base ball park, the foot ball field, returns on city, county, state and national elections, daily weather reports and advance notifications of educational and demonstration trains, necessitating the use of the long distance lines.

Although much of this information is accepted by the public as a matter of course, that furnished the smaller cities and towns on the toll system is particularly valuable to the operating company if given out in a manner to associate it with its particular service and is well worth the expense involved.

This is especially appreciated in such an instance as the national election, just closed, of so much interest to the public in general, and is well illustrated in the election returns given by the Tri-State Telephone & Telegraph Co., of St. Paul and Minneapolis.

To this company, with its 10,000 miles of toll circuits, its 36 exchanges, its connecting exchanges and toll points covering the state of Minnesota and North Dakota and parts of South Dakota and Wisconsin, a comprehensive report involves considerable labor and expense.

To illustrate, fourteen glass booths were set up in the employe's club rooms at the general offices, equipped with desk telephones and operators' receivers with head bands. The toll lines were grouped in the different booths, to reach all points connected to lines terminating at the main long distance exchange, one booth being reserved for the returns furnished the Minneapolis and St. Paul exchanges, where they were in turn given to the city subscribers. The lines were grouped by means of cords inserted in the regular multiple jacks at the switchboard.

All exchanges having terminating toll lines not accessible to the main office arranged to take the returns and relay them to tributary points. A circular letter was sent to all exchanges and toll stations advising them that the returns would be given.

The figures were received over a direct wire of the North American (Postal) Telegraph Co., were written on a large blackboard directly in front of the operators in the glass booths and were then repeated over the toll lines.

That this service was appreciated is evident from mention made in a number of local newspapers at the different points. The following editorial from the Red Wing Daily Eagle, is a fair indication of the commendation given the Tri-State company generally:

"The Daily Eagle has come in for a large share of praise for the election bulletin service with which Red Wing was provided last night and for its early morning extra which was on the streets at 4:45 a. m. this morning with telephone and telegraph election news up to as late as 4:30 a. m. The bulletins given out at the Pastime and at public gatherings last night from this office were said to be the best received in the city.

The Daily Eagle does not wish to claim all the glory and credit, however, for the Red Wing Telephone Co., which installed its special long distance election wire in this office is entitled to a large share of the credit. The Tri-State company, in furnishing the news of last night again proved its superiority over other telephonic and even telegraphic service by being from 10 to 20 minutes ahead of them with the most important bulletins."

This was augmented by a further item which appeared in the news columns of the same issue, which follows:

"Not enough praise can be given the service rendered by the Tri-State Telephone Co. in the matter of furnishing election returns from all over the country. For quickness and comprehensiveness it surpassed any other service ever offered of the kind. Comparisons are odious, so we will make none; but justice demands the highest words of praise for the Tri-State efficiency in this respect, and the Daily Eagle is under special obligation to the Red Wing exchange for exclusive connection with the through long distance wire."

Last week the Illinois Telephone & Telegraph Co., which operates the automatic system in Chicago, supplied its subscribers with election return bulletins without the installation of any extra facilities whatever.

According to calculations something like 200,000 calls for information as to election results were answered. A trunk from the Chronicle exchange to each of the seven other exchanges was utilized for bulletin purposes. For the down-town exchanges 30 local trunks were used for distributing information to the public; in the Cottage Grove office 60 local trunks were used, while in the West and Yards exchanges 10 local trunks were used.

Subscribers desiring information called number 9 on the dial, which connected them with the local trunk.

From the Chronicle exchange a trunk to the office of the Chicago Examiner was utilized. At the latter place a loud speaking transmitter was installed and readers at intervals gave out bulletins of the election results.

The only difficulty experienced in giving out the returns was that the transmission to the Cottage Grove exchange was rather poor. This was due to the high capacity of the trunks and also the number of people connected with them. This difficulty was quickly overcome by trunking from the Cottage Grove office to an amplifier in the Thirty-ninth street office of the Automatic Enunciator Co. The insertion of the amplifier increased the volume and no further difficulty was experienced from indistinct transmission.

With this arrangement over 1,000 people could listen to the bulletins at one time. It is estimated from the data of the battery consumption that over 200,000 calls were handled during the period from 7 o'clock in the evening until midnight, while there were something like 125,000 lost calls due to the trunks being busy. In many cases when the trunks were busy and people called in for the election returns, connection was made to the trunks by hand, thus putting more than one party on a trunk.

The local press stated that the Chicago Telephone Co. handled something like 150,000 election inquiries during the same period. The elaborate equipment which it installed for this purpose was fully described in these pages last week.

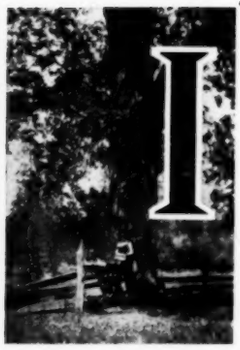
Authorizes Common Stock Issue in Ohio.

The Public Service Commission, of Ohio, has authorized the Fremont Home Telephone Co. to issue $25,000 of common stock. The proceeds are to be devoted to extensions and betterments of the system. The stock must be sold at par value or higher.

How We Built a Home-Owned Farmers Telephone Line

Reasons Which Led the Farmers of the Ahwahnee Valley, California, to Organize and Construct a Telephone Line to Provide Communication with One Another and Also with Oakhurst—Methods Followed in Building and Operating the Line

By C. W. Meyers



IT was this way. The farmers of the Ahwahnee Valley, California, had the use of a telephone line owned by a wealthy and enterprising citizen of a neighboring town. The service was good, the rates not burdensome, and they were well contented with it. But the owner had a good offer for his line, and naturally accepted it. The new owner got the idea that the farmers had become so accustomed to the benefits of a telephone service that they could not do without it. So they had, but he also got the idea that they would pay any amount charged for the service and stand for any kind of regulation that he chose to establish, but in this he was mistaken.

Well, the transfer had not long been made before the price of service was doubled, and many apparently onerous regulations were enforced, which made the telephone burdensome. The result was that a meeting of the farmers affected was called, 22 neighbors, who were interested in the matter came together. The outcome of much discussion and argument was a resolution to build a co-operative telephone line for themselves and operate it in their own interest.

The first matter to decide was an appropriate name for the line and the company, and "The Mountain Farmers' Telephone" was decided upon. Articles of agreement were drawn up, and as this was to be a purely co-operative line, these, of course, bore equally upon each one interested.

It was decided to build a first class metallic line, each member to bear an equal proportion of the cost for construction and each one to do an equal proportion of the labor of erection. A competent man was chosen as manager or superintendent of construction, and he was authorized to call upon the members when he was ready, for their labor. In case any of these could not be present, he was authorized to employ other help on a basis of $2.50 per day, and collect the amount from the party failing to respond. This was, of course, to equalize the work, and each member performed his proportion of the labor or provided or paid for a substitute.

When the day for work arrived there was a full complement present and they were divided into working gangs. One of these was started at each terminal point of the line and worked toward each other, meeting at the half-way point. Our superintendent took charge of one of these parties and appointed a foreman, who took charge of the other.

This line was to be built in the foothill and mountain section, and over a very large portion of the way, we encountered a great deal of brush, which we had to cut through. This constituted a large part of the work, and would be unnecessary in most places. But I am now telling about our experience in building a mountain telephone line, so will not digress to estimate what might have been under other conditions.

Working a great deal of the way through timber, and in the lower portion through a country where there were numerous oaks and other trees within easy reach, we required very few poles. This of course, greatly reduced the total cost, although the labor of getting brushing out the way would nearly offset this. Over the greater part of the way, we attached the wires to growing trees, using a pole occasionally to avoid too great a bend or to reach a house.

The first work done, was by one of our party who was sent ahead to select the most feasible route and select trees, upon which to stretch the wires. These he blazed for the information of the men who followed. Following him came the brush clearing squad. These cleared the way for the wiremen, and others whose duty it was to hang the brackets and put the insulators in place.

Now all was ready for stringing the wires and this was the simplest and easiest part of the whole work. One of the party drove a horse, which was hitched to a coil of wire. A coil of wire contains half a mile, and as he drove the wire was reeled off. On a crooked road, such as we had in the mountains, it requires a heavy pull as the wire gets toward the end of the reel, for half a mile of wire with all the dips, spurs and angles, together with trees and rocks in the path, offers a good deal of resistance, and it required a world of humoring sometimes by others of the party who eased it around or over obstacles. Having the wire laid, the next work was to get it stretched on our improvised poles. For this purpose a number of our party were engaged in the various parts of the work, some stretching the wires in order that the two should be so far apart that they would not interfere and short circuit themselves, others in fastening them to the insulators, etc. In short we all worked together and made a good job of it, glorying in the fact that we had a self-owned and operated as well as a self-constructed line.

View in Ahwahnee Valley, Through Which the Line Was Built.

With the lines all stretched, the next thing in order was the installation of the instruments. The ones selected have a five-bar magneto or generator and 2,500 ohm ringer, with lightning arrester and fuses to prevent all possibility of danger from lightning.

We have no central, but have separate bells, each one having a distinct signal for himself, and so we call each member directly.

In the future, should the requirements on our line become excessive, we shall divide it into two sections or more, as necessity may require, and connect the sections by a switch located at some store or private house where it can be attended to.

In Some Places, Wires Were Strung Upon Oak and Other Trees.

When the line was completed, a meeting of the stockholders, or members was called, for the purpose of estimating the cost and levying an assessment. Some of our members were dealers and gave the benefit of their discounts to the company, which somewhat reduced the cost of material. We found that it took nine days to build the line. This time was contributed by members or substitutes.

The material, including wire, brackets, insulators, and nails, with freight, which was something over $100, came to $23.70. The retail price of the telephone is $16 each, but buying in quantity and getting the trade discount, they came to about $12 for each of our members.

The line, consisting of two wires cost us about $42 per mile complete, and the whole work came to $46.82 for each of our members. The care of the line devolves upon the members, each one looking after a stretch between himself and his neighbor, and for this no compensation is allowed.

The officers of our company consist of a board of three directors, the president of the company being also chairman of the board of directors, and a secretary and treasurer. These meet twice a year, or at the call of the president, and all serve without compensation.

New members can be admitted, with the consent of the board of directors, upon payment of their pro rata of the original cost, about $46.82. If they live close to the line, the cost of connecting their service line with the main line will be deducted from this amount, and this line becomes part of the whole system.

There are other lines in this vicinity, and we have arrangements by which an exchange of service is extended, so that in our mountains we have telephonic communication with all parts of the surrounding country and with the outer world.

We have adopted a set of by-laws to prevent the abuse of our line among which, for instance, persons caught eavesdropping or listening to other's communications, will be assessed a fine of $10 and be cut off from service until the fine is paid. For a repetition of the offense he will be disconnected from the line, and cannot be again connected until he has paid the fine and received the consent of two-thirds of the members. There are also penalties for using the line more than seven minutes, for gossiping or visiting over the line, and for other abuses of the system. The rules are enforced by the officers whenever a complaint is made, but so far penalties have not been necessary.

In conclusion, the farmers of the Ahwahnee Valley, California, and its central town of Oakhurst, have a first class line. They own it themselves, are restricted by no rules except those of their own making and in their own interest, the cost was comparatively little, and with it there is a feeling of independence that is worth it all.

Central Office and Substation Equipment Supervision.

To supervise properly the equipment at the central office requires considerable detail work which cannot be given too much time, says M. J. Ennis in the Bell Telephone News. No doubt the most individually important part of the central office equipment is the storage battery, and, while it is necessary that this be given very close attention, it has been observed on more than one occasion that the person handling the storage batteries was not familiar with their action during the charging and discharging period. I do not believe too much supervision could be given to this part of the plant to be sure that it is in A-1 condition at all times.

Next in line of importance, no doubt, are the supervisory relays which should be watched closely to see that they are operating properly. If there are numerous supervisory relays out of adjustment on the switchboard, it is impossible for the traffic department to furnish satisfactory service. It is very well to watch tests on these relays made twice a week and to observe if the same relay appears in trouble consecutively; also to see that the total number of relays found not operating properly does not exceed the proper proportion of the total number.

Line relays should be gone over at least twice a year to see that they are adjusted properly and are kept so; also when a new relay is installed to know that this has received the proper adjustment rather than be installed with the armature showing a good action. Supervisory relays need more attention than a line relay because if the supervisory relay were out of adjustment any and all subscribers could be affected, whereas if the line relay were out of adjustment, it would only affect that individual line.

It is very necessary that the man doing the switchboard work be a competent man, as trouble can be caused by incompetent work which never can be overcome. For instance, in soldering wires on relays and other places an incompetent man frequently leaves a job in such condition that the insulation on the wire will peel back, which presents a bad appearance; also, in repairing troubles in the multiple, if this work is not done in a proper manner in a short time, the multiple begins to look bad and it can never be put in good condition, so it is necessary that this be carefully supervised.

The main frame and the intermediate frame should be gone over carefully and frequently to see that all of the work done is properly soldered and that no loose connections are left around these frames. Also an important item is to know that the proper style of fuse is used on the fuse panel for the different circuits and as this can very easily be done, it is well to go over the entire fuse panel quite often and check this.

Cleanliness is a big item in the matter of central office supervision and where you find a switchboard and the other frames which are not free from dust, you may usually expect to find poor attention paid to the different repair

work. The dust on the relays inside the switchboard and the different cord shelves should be removed at all times and relays and shelves kept in a clean condition. When an inspection of this is made and the first appearance presents a clean condition, nine times out of ten you will find that the equipment is also in good condition.

Close supervision should be given to the charging machine and ringing machines to know that the commutator on the machine has a smooth surface.

The cords on the switchboard should be looked over to see that ragged cords are removed when they become frayed and look bad. This is an item which frequently does not receive as close attention as it should be given. Of course, it is very necessary that the cards and cable records covering this equipment be in good condition and up to date at all times. A good method of supervising this work is to take approximately 20 cards from the wire chief's and 20 cards from the chief operator's files, both of these at random, through the entire amount and check one against the other. This will offer a good idea of the condition of these cards as regards correctness.

To supervise properly the substation equipment, a certain proportion of each month's installations should be inspected to see that the work is done in a proper manner and that the cards and cable records, connection notices and chief operator's records all agree. On the inspection of this work it is necessary that the men be notified of any defects found and to observe on the next month's inspection if these same defects occur. A good plan is to call these items to the installer's attention in each instance.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Rate Reduction in San Francisco.

Final drafts of the proposed ordinance reducing telephone rates in San Francisco have been received by the Telephone Users' Association from the engineers in charge of the matter. Initiative petitions will be immediately prepared by the attorneys for the association, and the ordinance will be submitted for the approval of the people within a short time.

If the ordinance is sustained, it will bring into effect the first substantial cut in telephone rates made in San Francisco for many years. The principal reductions will be among the business and professional telephones. The $5 a month telephone is cut to $4, with excess calls at four cents, a reduction of 20 per cent. The $7.50 telephone is cut to $6, and from thence, up to the service which now costs $19.57, the cuts run from 20 to 25 per cent.

On the private exchanges used by the larger business houses and hotels, little or no change will be made in the flat rate, but the present charge of 2½ cents per call is cut to about 1½ cents, which is the price now charged by the telephone company for calls in excess of 3,000 a month.

Residence telephones are cut in lesser degree. The telephone which now costs $3.50 a month is reduced to $3. The rate on a few of the cheaper telephones remains unchanged, the engineers having advised the Telephone Users' Association that the present rates cannot be reduced much without depriving the telephone company of its legitimate profits on its investment in this character of instrument. The nickel-in-the-slot telephones are cut practically all along the line.

An important change is made by a section which provides that bills for telephone service shall not be due until the first day of the month following the rendering of the service. At present the telephone company forces its subscribers to pay in advance. The new section places the telephone company in the same position as the gas, electric or water companies, which collect their bills, like any other business house, after the goods have been delivered.

Not even the Chinatown exchange has been overlooked by the engineers of the association. It has been the custom of the telephone company to charge the Chinese a flat rate for all messages inside Chinatown, and five cents each for messages outside this territory. A considerable cut has been made in the Chinatown rates.

"More than 3,000 of the largest business firms in San Francisco have signed agreements with us," said C. E. Ward, secretary of the association, to a local newspaper. "The list reads like a roll call of the Chamber of Commerce. A movement to which such a number of representative firms have subscribed must be treated with respect. The people of San Francisco have been paying at least $500,000 a year to the telephone company in excess of what is charged inhabitants of any other city of similar size in America.

"The Telephone Users' Association has been careful not to propose any cut which would deprive the telephone company of a legitimate profit upon its investments, and the rates indicated in our ordinance could be reduced fully 25 per cent. more."

Claims New York City is Defrauded.

The New York Herald, in a recent issue, says: "The impression that the city has been tricked for years by companies having control of the conduits through which electric wires are conducted under the streets is confirmed by the report of Controller Pendergast.

"According to this report specifically determined sums out of which the city has been defrauded aggregate more than $3,000,000, while the amount of which the city has been deprived by peculiar methods of finance and bookkeeping is much greater.

"There are two companies—the Consolidated, through whose conduits the high tension electric wires are carried, and the Empire City Subway Co., through whose conduits the low tension wires are conveyed. Both are today controlled by the Bell Telephone Co., otherwise known as the American Telephone & Telegraph Co.

"By the original contract the city was to receive all surplus over 10 per cent. earned, but by familiar jugglery—bonds sold at a discount to insiders, construction accounts, etc., etc.—the city's share under this contract has been nothing, although it has contrived to collect something under the franchise tax law from the 'estate in the street' claimed by these companies."

Right to Merge in Kentucky.

A Louisville, Ky., dispatch says that the constitutionality of the act of 1912, permitting competing toll line telephone companies to consolidate under direction of the Kentucky Railroad Commission may shortly be tested.

It is suggested that it may conflict with section 201 of

the constitution, which says, "no railroad, telegraph, telephone, bridge or common carrier shall consolidate with any other parellel or competing company," and which specifically prohibits purchase, operating, pooling earnings and acquisitions of capital stock.

The act of 1912 says competing or parallel telephone systems in cities may consolidate, with the consent of the city council, and competing or parallel toll lines may consolidate with the consent of the Railroad Commission, when it is not shown that existing competitive conditions are any benefit to the community.

That point has not yet been raised, but Police Judge C. B. Brewer, of Fairview, Todd County, has complained to the commission that the Christian-Todd Telephone Co., which is a consolidation of the Cumberland and the Independent companies in Todd county, is about to violate the agreement made with the commission that it would not increase rates above those charged by the constituent companies when they were in competition.

The application of these companies to consolidate was the first considered by the commission, and, after a hearing, it is stated, permission was granted on condition that rates should not be raised. It is this stipulation that Judge Brewer says is to be violated.

What the Railroad Commission can do is a question. The law, it is stated, gives it no authority to regulate rates, and whether, after entering a final order granting permission to the consolidation, it can do anything to enforce the condition, no one seems to know. The members of the commission themselves were dubious about the law, but acted on it as they found it.

While Judge Brewer is interested in compelling the company to keep the pledge as to its rules, he did not intimate that he would take any steps to employ counsel to test the act's constitutionality.

Attorney General Garnett said the matter had been referred to him by Judge Brewer, and that he is considering it.

Claims Big Reduction at Baltimore.

The new telephone rates in Baltimore city, based on the new contracts made prior to October 1, will result in a saving of $134,475 a year to patrons, according to a report just made to the Public Service Commission by Charles E. Phelps, Jr., chief engineer. Mr. Phelps bases his estimate on the rates formerly charged by the Chesapeake & Potomac Telephone Co.

Ever since the commission announced its decision in the telephone rate case the company has been making new contracts, with the result that nearly all this work has been completed.

Mr. Phelps gives the figures of the saving to subscribers as follows:

On 6,105 message rate stations	$99,945
On schedules C and F.	11,628
Residence stations on two-party lines	23,902
Total.	$134,475

This, says Mr. Phelps, shows an average reduction of more than 20 per cent., as compared with the rates previously in force, and this saving is distributed among the 11,860 stations of the company served by the Baltimore city exchanges.

Notifies Commission of Purchase.

The New York Public Service Commission has received notice from the New York Telephone Co. that it has purchased and acquired the physical property and business of the Commercial Union Telephone Co., comprising the exchanges at Warrensburg, Lake George, Ballston Spa, Schuylerville, Greenwich and Valley Falls. The notice states that the com-

Meeting a Rate Controversy.

The Columbia Telephone Co., of Columbia, Mo., has adopted a novel, though practical, method of securing data to aid it in a controversy with the city council over rates. The council recently sent notice to the company to the effect that the charge for installing telephones must cease immediately; that the city must have free telephone service in consideration of the use of the streets by the company; and that the company must, at the next meeting of the council, "show cause for charging higher rates than (are charged in) any city the size of Columbia, in Missouri."

In order, as he stated, to be able to "show" the council, J. A. Hudson, president of the Columbia Telephone Co., sent out a number of printed forms containing the questions here reproduced. These were mailed to companies throughout a territory which would afford a fair comparison with the situation at Columbia.

REQUEST OF COLUMBIA TELEPHONE CO. FOR INFORMATION.

Statement of .....
Give Name of Your Company.
Location. .....
Is your company Bell or Independent.....
Have you a competing plant?.....

Rates to Business Stations.

Private or direct line unlimited service per month. ..... $.....
Party line unlimited service per month.... .....

Private Residences.

Private or direct line unlimited service per month. ..... $.....
Party line unlimited service per month.. .....
About how much territory is covered by your company's lines over which you give free service. That is, about how many miles square? ....
Is your plant central energy or magneto? .....
What has your plant and business cost? .....
Do you collect quarterly or monthly?.... .....
Do you render bills for service in advance, or do you let the period billed for expire before rendering accounts? ....
What percentage do you consider will safely cover depreciation? ....
What percentage on investment do your net earnings amount to, after allowing a safe depreciation fund? ....
How much do you allow for depreciation? .....
What dividends do you pay?..... .....
Do you charge an installation fee?..... .....
Do you require a deposit?..... .....
Number of telephones, or stations, in service? ....
Average rate received for service per month per telephone? ..... $.....
Number of calls per day per station?..... .....
Average receipts for service per call?.... .....
Name of company. .....
By. .....
Give official position.....
Date.....

Copies of the form and the letter which accompanied it were sent to TELEPHONY with the suggestion that the idea was a valuable one, and one which might profitably be employed by other companies in a like situation.

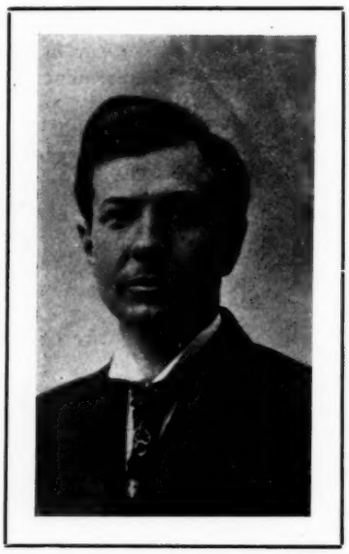
No advice has reached this paper as to the responses to Mr. Hudson's appeal, nor as to the use which he has made, or will make, of the data thus obtained. We shall hope to present these facts in a later issue.

How to Avoid Existing Huge Loss in Toll Earnings

An Inexpensive and Thoroughly Practical Manner of Systematically Handling Toll and Long Distance by Which Big Savings May Be Effected—Co-operation the Keynote—Address at Meeting of New Service Association

By W. S. Vivian

In the minds of many of us humans there is a strong desire to get something for nothing; we want big returns quick. Many of us think that opportunity lies in some far distant field of action, either in the north or in the west or in the south or in the east, whichever is farthest away. Sometimes we are so taken up with this idea that we become absolutely blind to the golden opportunities which lie right at hand and within our individual province.



W. S. Vivian.

Many of us have traveled along a country highway and in passing a farm, have noticed a mower lying out in the open exposed to the storm and weather, and over yonder we have seen a binder equally exposed; there in the barnyard was the wagon, left where they unhitched the last time. Uusally, where these things are noticed, you found that the buildings, fences and general up-keep of the place were not what they ought to be, and the comment was, "No wonder that farmer is not prospering." Why? Because he is wasting his opportunities and his revenue by not taking care of his investment.

Why has he not placed his tools and implements and conveyances under shelter where they would be protected? Where, when he wants them, he would know where they were? Where he would not have to spend unnecessary time and energy in getting them when wanted?

The chances are that farmer was thinking that if he had a farm somewhere else he would be more prosperous; or perhaps he thought he would be more successful if he were in some other business; or perhaps he didn't think at all. Perhaps he was too much of a coward to think out his proposition, and face the facts.

Many in the telephone business today are a good deal like that farmer. They have been furnishing service below cost; they have been slack and careless in their collections; they have discriminated in the matter of rates; they have used slipshod methods in keeping their equipment and construction in repair; they have paid no attention to depreciation or providing for replacements; they have paid no attention whatever to the operating or traffic department.

Some have not had even sufficient interest to keep posted by subscribing for TELEPHONY—which is the best telephone magazine published, each issue being full of good practical ideas—to say nothing of paying out real money to attend telephone meetings and conventions.

Furthermore, those who come in this class don't like to be reminded of their shortcomings. *They don't want to face the facts* and provide a remedy. Someone has well said that the "biggest fool is he who fools himself."

BIG ANNUAL LOSS MAY BE AVOIDED.

Isn't it high time that we wake up and proceed to work along lines of improvement for every department? You reply that you are not in that class. Well, possibly not, but let me remind you that at this present time *the telephone investors of this country are losing millions of dollars annually that they could just as well have, because you refuse to do your duty in fully co-operating with your connecting companies.*

You say: "How is that? Haven't I at sundry times and places in our district, state and national gatherings endorsed the appointment of committees to improve the plant, traffic and commercial departments, to prepare uniform and standard operating rules, etc., etc.?"

Yes, and you have also appointed committees to prepare suitable resolutions of condolence and sympathy to be sent to the bereaved. And the work of the latter committee is always effective and helpful, which is more than you can say of the others. Not but what the committees worked hard and perhaps individually received large benefits, but *because they could not get the co-operation and backing they needed* from you men in the operating field. When they wrote you requesting information, did you immediately reply?

Yes, on the one hand, you have perhaps helped to appoint committees, but on the other, you were perhaps so afraid that you would give away some information that might not be altogether complimentary to your company, that you just didn't, and therefore blocked the efforts of the committees to help you.

Or, perhaps your neighbor was appointed on the committee, when you wanted the appointment. Of course, you didn't say a word about it, but you just made up your mind you would have nothing to do with the committee—and you didn't—and their work was ineffective. Or, perhaps an organization of a number of companies was effected that was going to supervise certain parts of the work, one which would be of material assistance if it could be carried out. But here again we find that you were afraid that possibly they would find out too much about your company, or, possibly, that it would be necessary to give a little authority to some outsider which you absolutely refused to do. Therefore, they were forced to labor under a handicap.

OUR ADVANCE HALTED BECAUSE OF OUR OWN FAILINGS.

It seems fair to say that we have advanced no further than we have in rendering an efficient service to the public because you and I and others have refused to do the things necessary to advance. The great wonder is that the advancement and development of the telephone business has been as great as it really has, surpassing by far the development of any other utility.

Our refusal to co-operate, however, has cost us immense sums of money and I now wish to submit to you a few figures for your consideration. The telephone report of the Department of Commerce and Labor for 1907 is supposed to be fairly reliable, as far as it goes, although we all recognize that it is not complete and that the real figures, if full statistics had been procured, would have been larger.

This record shows that the commercial systems of the Independent and Bell companies handled long distance and toll messages numbering 251,728,238. This was an increase over 1902, which was five years earlier, of 109.8 per cent.

We will not be far out of the way for 1912 if we estimate

that there was another increase of 100 per cent., making the total number of messages 503,456,476. In an analysis of 68 exchanges which was made recently, the average message value was 20.6 cents, which would make the total toll revenue $103,712,034.

Seventeen Millions Lost.

Traffic engineers are pretty much agreed that, of the messages offered, practically 15 per cent. are not completed for various reasons. Therefore, this figure of $103,712,034 represents only 85 per cent. of the business offered. *If the entire business had been completed it would have amounted to* $120,837,687, *or* $17,125,653 *more than was actually received.*

I wish to ask you, Mr. Manager, is there any objection to trying to save any part of this seventeen million dollars? You say: "You are dealing with the entire toll business of the country, which includes the Bell. For our purposes you had better eliminate the Bell figures." Very well, we will do that.

The same report of the Department of Commerce and Labor above referred to, shows that the Independent systems handled 60,113,954 messages. The Independent systems have easily doubled their traffic in the past five years and, therefore, they will during 1912, handle 120,227,908 messages at an average value of 20.6 cents each or $24,766,949, which figure represents 85 per cent. of the business offered. If the entire amount offered had been completed, we would have had $29,137,705 or $4,370,756 more revenue than we will receive in 1912, on the above basis.

It is definitely stated that reports of many Independent companies did not get into the department's hands, and, therefore, our actual business is really considerable more; and, the greater the actual business, the greater would be the above figures.

Mr. Manager, as the direct representative of your security holders should you not be willing to co-operate and assist in a practical way in establishing a uniformity of service, if by so doing a large portion of the present loss can be saved, your stockholders be better protected and your securities strengthened? Purely as a commercial proposition, would it not pay you to co-operate if you could get your share of this nearly four and a half million dollars and more? If you do not co-operate, are you not somewhat in the position of the man who, tradition tells us, "cut off his nose to spite his face." Only in this case you are worse than that man because, to a certain extent, you block the improvement in efficiency of your neighboring companies.

Need for Standard Operating Rules.

How are you going to go at it to save this great loss in revenue? In the first place, one of the necessary and absolutely essential things is that the Independent telephone companies of this country agree to adopt a specified set of standard operating rules, and that they not only agree to adopt such rules, but that they actually put them into practical force and effect.

How can this be done? By mailing them to the managers of the several offices? Some good would possibly be derived from the more energetic managers from this source, but we would never have uniform operating methods. How then? By each company sending out a traffic instructor? No. While a great deal of good could be accomplished that way and a great improvement effected over present conditions, the objections are these: First, each traffic instructor would have his own ideas and his own interpretations; second, the smaller companies are so organized that they can not, for a number of reasons, send out a traffic instructor. Thus the larger systems would have a fairly good operating staff whereas the smaller companies would remain practically as they now are and would receive little or no benefit.

How then should we go to work with our present complex organization?

Let us take Chicago as a basis. That city's commercial territory extends for at least 200 miles in every direction. The companies within that territory should agree to support an institution or organization which would have the means at its disposal to hire a thoroughly competent traffic man, who could proceed with an aggressive operating campaign throughout that territory. This would be done, among other ways, by urging the adoption of standard operating rules, which will be adapted to the use of the smaller offices as against the larger offices, and by having groups of operators gather at various centers where these rules can be explained to them in detail and illustrated properly, and where the operators who will do the work can become acquainted with each other. There are various other ways in which results could be accomplished.

Possibilities of Effective Traffic Organization.

The man at the head of an effective traffic department such as this will naturally, in a short time, establish a uniform method of handling every phase of the ticket from the time it is recorded until the messages are completed. He will look after matters of routing so as to provide channels for the passing of the traffic in such a manner as to avoid the congestion which now often occurs, and thus eliminate one great cause of loss at the present time.

He will recommend through, or switching, positions in offices where the traffic demands it, in getting through the messages which they switch, so that there may be as little delay of time as possible, thus getting away from the present condition, where the through office reports busy circuits and gets its own messages through regardless of any and all others.

He will notice the equipment and the facilities of each office as he has opportunity, giving especial attention to the efficiency of operators' telephone sets, cords, circuits, their systematic tests, etc., making manifold reports of his findings to the local manager, district manager, general manager, etc., as might be necessary.

There are these and many other ways in which such a man could be of great value, because he would ever have in mind, efficient long distance telephone service, and all of his suggestions and recommendations would be based upon that single idea.

Greater Revenues from Greater Efficiency.

So far this refers to the savings that can be effected by a uniform system. The revenue would greatly increase because of an added efficiency in the amount of work the operators can handle and in the increased number of messages that can be handled over the present circuits. The operators at the board would become far more skillful in the handling of their work. They would secure proper information from the subscriber or patron when they file the ticket, and thus avoid the condition which is so customary now of having to hold the circuit 50 or 100 miles to go back to the subscriber or patron, thus annoying him to get additional information. Such a department would gradually get down to a system in the work that would show the actual conditions.

This, however, can only be obtained by practical co-operation. You may ask what I mean by practical co-operation. If your co-operation only amounts to the talk we can get at our meetings, it is no good so far as accomplishing anything is concerned. But if, when the traffic man writes you for information, you immediately go to the trouble and expense of securing it for him and, when he comes to visit your office, you turn the office over to him, then you have a right to look for practical and beneficial results.

If, when the traffic man is in your office and he suggests that you render to him certain and sundry reports every week or month, or whatever the period of time may be and you promise to do it, then such reports should be on his desk at the time agreed upon. It should not be necessary for him to have to write you repeatedly, and finally get an excuse

that you have been too busy to get out these reports. I want to emphasize the thought that that kind of co-operation which makes excuses is no good whatever. It becomes a liability and a source of expense and makes prevaricators out of otherwise well-meaning men.

IMPROVING OFFICE EQUIPMENT.

The traffic man, when he accomplishes all that is here suggested, has not more than started on his work. At the present time a great majority of offices are equipped with clocks rather than with timing devices, such as the calculagraph or the Monarch time stamp. Many of the clocks are altogether unreliable, many of them being little dollar alarm clocks or dollar watches. Either of these may be all right for the purpose for which they were intended, but they were not designed for the operating room.

If they are to be placed somewhere in an operating room and the operator must look from her board to wherever they may be hanging to record the time she receives a ticket from a patron, or the time the parties start to talk, or the time they get through, or the time she receives a ticket from some distant office, you may depend upon it that the time will not be accurate in most cases.

Imagine yourself an operator. The clock is some ten or fifteen feet away from you and you put up a connection where the parties start to talk. You find that the minute hand is somewhere around the Roman numeral which shows on the clock as VIII, which means twenty minutes to the hour, what time would you put on the ticket? The chances are you would put down 20 minutes to eight, when it might be 20½, 21, 21½, or even 22 minutes to eight, or it might be 19½ or 19, or 18½ minutes to eight, allowing an opportunity for several minutes variation from the exact time. This is just what the operators are doing many times each day.

THE WASTE IN OVERTIME.

By watching the overtime records from such offices we notice that the amount of overtime checked is usually very small. Taking the country as a whole, I believe you will find that the average office checks not to exceed 5 per cent. in overtime. That is to say, if the toll business amounted to $100 a month, that not to exceed $5 of that would be received from overtime. What would you think then if I tell you of individual offices, where a campaign has been carried on for the past two or three years, that are checking as high as 25½ per cent.? What would you think of a total of 68 exchanges where we have been agitating this question for one year now checking an average of 12.1 per cent.?

Exchanges may easily average about 15 per cent. in overtime if they have the right instruction and the right equipment. What would it do for you in your system if you could increase your toll revenue from 10 to 15 per cent. by simply checking the accurate time?

Using as a basis the figures that I used before, namely, the estimated toll business for 1912, $24,766,949, reflect that if we could increase that by 10 per cent., we would immediately have nearly two and a half million dollars more money. Do you not think it would pay to go to the expense necessary to hold such schools and to provide such rules and to render an effective co-operation to whomsoever this work might be turned over?

At the present time you are not legally forced to do any of these things, but if your revenue can be materially increased so that at the end of the year your earnings would show an improvement in the right direction, why not get behind a movement of this kind and boost for all that you are worth?

WHAT ONE COMPANY HAS DONE.

I know of a company which has rendered steady active co-operation along this line for nearly three years; which has advertised its toll business by the distribution of blotters, calendars, etc.; which has advertised the toll business by getting the operators together frequently; and which has advertised the business by furnishing a first class service. The result is that, in an agricultural community comprising in the neighborhood of 50 exchanges and 11,000 telephones, the average toll business per telephone for the year which recently closed was $5.54. Are you doing as well as that? Don't you really think that practical co-operation with your connecting companies, even though it may cost you a few dollars to bring it about, is one of the very best methods of assisting yourself and increasing your own revenue?

Is that $7,000,000 and more which is now being lost each year worth saving?

Copper Stocks Increase in October.

The monthly statement of the Copper Producers' Association, giving the production and consumption of copper in the United States in October, shows an increase in stocks on hand of over 13,600,000 lbs. The figures for last month, as compared with September last and October, 1911, together with stock on hand at the end of each month, follow, figures in pounds:

	Oct. '12	Sept. '12	Oct. '11
Stocks previous month..	63,065,587	46,701,374	140,894,856
Production	145,405,453	140,089,819	118,224,442
Total	208,471,040	186,791,193	250,150,298
Domestic delivery.....	84,104,734	63,460,810	64,068,307
Exports	47,621,342	60,264,796	60,084,349
Total	131,726,076	123,725,606	124,152,656
Stocks remaining.....	76,744,964	63,065,587	134,997,642

Several surprises were contained in the Producer's statement, says Financial America. Chief of these was the record breaking deliveries to domestic consumers of 84,104,734 lbs. This showing was the source of much gratification in the trade, as it reflected quite clearly the enormous consumption of the metal that is going on in this country.

All of the large brass manufacturing concerns, as well as the copper sheet mills and other large consumers using considerable quantities of copper in their products, are very active, especially the former, who are said to be working 24 hours a day. Another feature and one which was commented upon quite freely, was the light exports to Europe.

Jacksonville Home Organization Completed.

The Home Telephone Co., of Jacksonville, Fla., has incorporated for $1,325,000. The officers elected are: Charles Blum, president; John J. Ahern, vice-president; A. S. Metzner, secretary and general manager; and J. W. Ingram, treasurer. Judge John W. Dodge is general counsel.

The board of directors includes the foregoing and A. R. Warrock, John G. McGiffin, J. S. Maxwell, Albert M. Endel, Leopold Furchgott and J. C. Halsema, all of Jacksonville; and L. G. Hirth, of Fernandina, Fla.

A construction engineer will shortly be on hand to begin work probably this month. The company now has 2,500 subscribers. The Bell has about 6,000, and it is confidently believed that, when operation is actually begun, the new company will have fully as many subscribers as the Bell, and possibly more, as the enterprise is popular throughout the city.

Meeting of Railway Telegraph Superintendents.

A joint meeting of the eastern and western divisions of the Association of Railway Telegraph Superintendents, will be held November 20 in Superintendent Bennett's office at the headquarters of the C. & N. W. Ry., Chicago. A chairman and secretary of each division are to be elected and other matters will be discussed.

The Automatic Electric Co., through J. H. Finley, has extended an invitation to members to visit its works and make a trip through the Illinois Tunnel.

Practical Subjects—Letters and Discussions

Letters From a Retired Lineman to His Nephew.

Podunk Valley Farm.

My Dear Nephew:

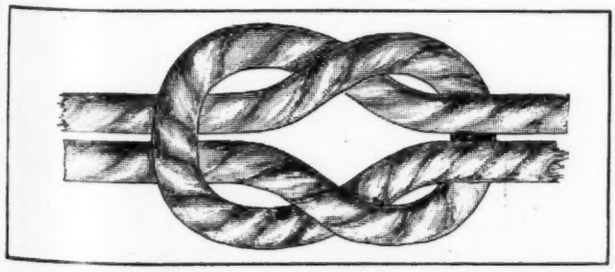
I rather expected it In fact, I knew it had happened, but I wasn't sure you'd come to me for advice From what you say, and that is all I have to judge from, your foreman is a pretty level-headed chap I should say. You write that you are tired of the business already, as there don't seem to be anything ahead to work up to. If you had stopped there, I might have put a different construction upon what you said. But you go on to say that you have made several practical suggestions to the foreman and he don't seem to take any stock in what you say. Not knowing just what suggestions you made, I cannot express an opinion as to their value. But from experience I feel quite satisfied that unless you are a genius, the things you suggest have been tried out years ago. If you are a genius, you will find a world of opportunity ahead of you.

From what you say, your foreman apparently knows his business, so instead of trying to improve upon the methods in practice, familiarize yourself with every detail and maybe in the course of five or six years you will be qualified to suggest an improvement. A foreman who is doing the amount of work you say Halloway is with ten men, doesn't require many suggestions from a cub lineman. He needs your mind on the work he lays out for you and it will be a good scheme for you to do it his way for a while. The time may come when you can find opportunity to use your ingenuity. But ingenuity is only for emergency. It doesn't usually follow along practical lines.

I know of a lineman who was sent out on trouble and found a span down in a river. The stream was high and there wasn't any chance of taking a wire across in a boat. Well to make a long story short, he found a spool of linen thread in his grip, and having a newspaper in his pocket, succeeded in making a kite. This carried the thread across. He found a crossing for himself at a railroad bridge some distance up the stream. But by beginning with the kite, he managed to get the wires in place without help. This instance comes far from establishing the fact that telephone men should be schooled in the art of kite making. Such opportunities for its use come to a man but once or twice in a life time.

Some day you may have the opportunity of facing a four-man job all alone by yourself and miles from help. Save up your ingenuity until then. In the meantime learn to do the work required under standard specifications.

I expected also to hear that you had experienced a little fall. I guess it will be a good lesson to you not to attempt to do circus stunts on the cross arms. Trapese performers receive



This Knot Drawn Taut Will Not Slip—Easily Untied.

better pay than you do. It doesn't pay to give free exhibitions anyway, and you say there wasn't any one to help you pick the slivers out of your arms and legs. In other words your little exhibition was a fizzle.

I learned my lesson early in my career by seeing another fellow going through the exercises laid down by experience. It was "Red" Miller. Red was a regular lady killer, and once when he was tying in a pole opposite the hotel, several of the girls came to the windows to watch and admire him. Red became rather reckless and I guess forgot that he was working above an osage hedge until he landed among the thorny branches. He was a good half hour getting himself extricated, and besides was pretty badly scratched up.

I know the foreman's job looks attractive to you, but you make the usual mistake of presuming that his work is not as hard as a lineman's, and that the pay is almost double. It took me a long time to get it through my thick skull that, under ordinary conditions, a two dollar pair of gloves is worth just twice as much as a one dollar pair. It's the same way in working for a salary. A man getting $200 a month, works just twice as hard as he did when he received only $100, and so on. Of course there are exceptions, but as a general rule it evens up in the long run, because for every fellow who gets what he doesn't earn for a while there's another fellow earning more than he gets.

If you want a foreman's job, go after it, but don't work along the line that it will be less work for more pay. A man can't go two ways at once, any more than he can be in two places at one and the same time. When you get beyond wearing blisters on your hands, you'll wear them on your head, on the inside I mean, if there's enough grey matter in your skull to support one.

Don't forget there is a right way and a wrong way to do everything, and at least 50 wrong ways to knot a rope. When you hook a block to a rope, place the rope double in the hook. This divides the strain and prevents cutting the rope.

I bought a brindle calf with the ten dollars you sent. I've got plenty of pasture and there isn't any expense in keeping him.

Well, it's time to "hit the hay pile," for this old world seems to turn faster in the night than by day.

Your Uncle Dick.

What is Proper Protection for Magneto Subscribers' Sets?

I would like an answer to this question: "What is the proper protection for the subscriber's station?"

The following points should, I believe, be studied in order that the correct answer may be obtained:

1. The value of the protector proposed in safeguarding the subscriber and instrument.
2. The cost of clearing protector grounds and replacing parts.
3. Its first cost and installation expense.

Protection for magneto instruments is the branch I particularly wish to see discussed, as most small companies operate this class of equipment, usually without the aid of an engineering department. These may be divided into city and rural telephones, for the same protection may not be required for both.

I have seen companies operating under the following conditions in regard to protective equipment. None at all; manufacturer's protector mounted on telephone; carbon blocks placed at points where wires enter building; fuses placed as above; fuses and carbon blocks; fuses, heat coils, and carbon blocks. Now what method should be used to secure the greatest safety and economy?

Michigan. W. H.

Something New in Scrap Books.

One of TELEPHONY'S subscribers devised sometime ago, and has since been keeping up, a scheme for filing for ready reference articles and even short items appearing in the

pages of this and other papers, which is unique and practical.

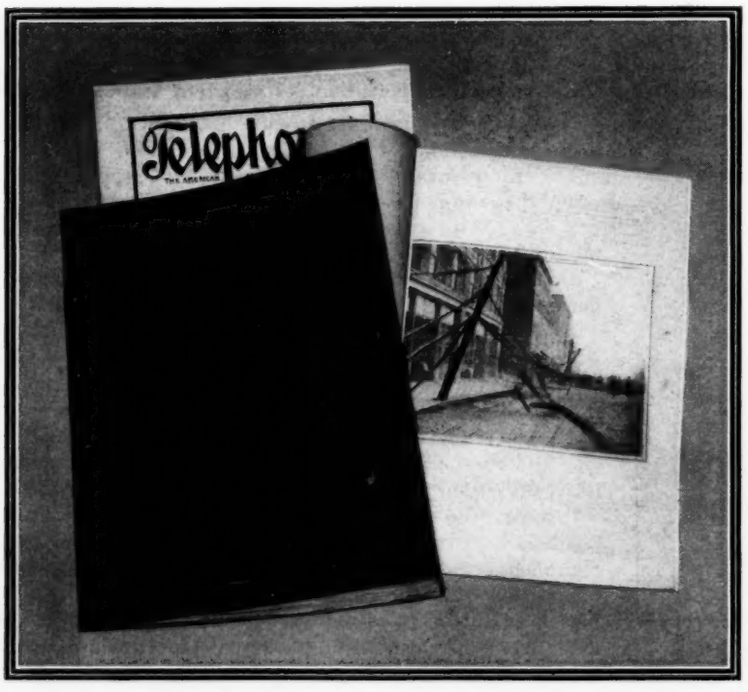
The plan involves the removal of entire pages from the papers which contain the articles or items it is desired to classify and file for reference, and their ultimate binding in small volumes with flexible covers. All matter on a common subject is included in the one book, the pages being retained in loose form until enough have been gathered to complete a volume of convenient size.

The original page numbers are disregarded in the new volumes and a new consecutive series of page numbers is stamped upon the pages. The volumes are numbered from one up, and matter is then indexed by volume and page, as follows:

	Vol.	Page
ECONOMY:		
Telephone economy	2	4
In exchange management	2	9
Turning junk into dividends	3	31
All-cable construction	4	5
In toll line construction	8	8
False economy (Buy your own paper)	8	12
Collecting and accounting	10	22
Economy in operators' loads	14	24
One company operates for 30 per cent of gross	14	44
EDUCATION:		
Telephone and the school	1	13
School at Spokane	18	65
EFFICIENCY:		
What an employe can do for the company and himself	1	51
ELECTROLYSIS:		
At Winnipeg	1	62
Electrolytic corrosion of cables	4	30
The ranking decision	17	1
ENGLAND:		
Construction practice	2	45
Gerrard exchange	12	16
Long distance methods in England	10	3
British Channel loaded cable	13	2
Aerial cable construction	3	38-40-1
Aerial cable construction	3	43-45
Aerial line construction	3	37-49
Measured rates	4	27
Special telephone cables in Great Britain	4	34

"The classifying of the various articles under the various specified subjects consumed considerable time and work," says the man who devised the plan. "The stenographer took the dictation in a large book alphabetically arranged. Under the thumb index she arranged the subjects, and dictated the name of the article, or clipping, together with the page and volume numbers. This sample page of our index is alphabetically arranged as far as subjects are concerned, but not according to items. In the twenty-two volumes now prepared we have 107 subjects, with from two to 22 sub-heads. These 107 subjects cover a wide range of matter and include the names of states and countries.

The photograph here reproduced shows the general appearance and size of the volumes. The binding is done in a local job shop at a cost of 12 cents each.



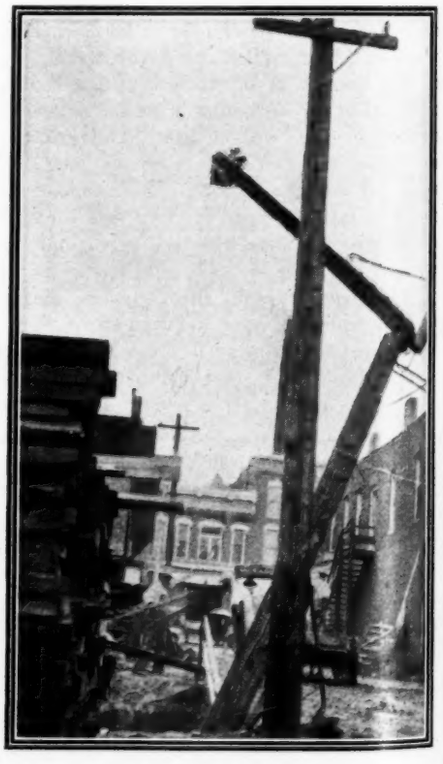
Flexible Covered Scrap Books, Using Full Sized Pages.

Telephones in Austria.

According to the government report, at the beginning of the fiscal year 1912-13, there were in Austria 1,035 local telephone plants, 1,037 main central stations, 290 secondary exchanges, 2,015 public stations, and 265 automatic public stations. There were 96,394 individual subscribers and 32,947 party line subscribers. There were 645 interurban lines, aggregating about 20,000 miles.

No Serious Interruption of Service.

The photograph from which the accompanying reproduction was made was received by TELEPHONY from R. L. Comstock, York, Nebr. The circle top distributing pole, which carried a



Wreck of Circle Top Distributing Pole.

50-pr. cable terminal and 38 duplex drops to subscribers' premises, slipped into a cellar excavation with the result as shown.

The damage was repaired by four men in ten hours and service was not interrupted for more than five minutes on any one line. The new pole was set in concrete.

Practical Telephony for the Practical Exchange Manager

Ninth Installment of a Series of Articles Relating to the Management and Operation of a Moderate Size Exchange—Pole and Other Records—Value of Study—Discussions of Magneto and Common Battery Systems

By H. R. Van Deventer

Poles are seldom kept in stock by a small company, but where they are, a record should be kept of the sizes and classes. The poles should be roughly marked so they can be easily identified in case a particular one is desired. Always unload poles butt first from the car, otherwise the tops are liable to be split. They should be peeled before piling up for storage.

Some Essential Records.

A record, a letter size sheet 8½ in. x 11 in., should be kept of each line, and every pole in the line should be numbered, beginning with the pole nearest the office. Where the line is a branch line, the numbering may begin at the main lead of poles, the branch line being designated by its number or an arbitrary letter. For instance, suppose the branch lead carries line No. 29 from the main lead, then the first pole on the branch lead would be 29—1, the next 29—2, and so on. The office location record shows the distance between poles and the material used on the line. From time to time, as additions or repairs are made, the material used is listed upon the record sheet. This record is a complete history of the physical line and enables its cost value to be readily estimated.

This system of numbering poles is also of great assistance in locating trouble. A test can be made and the trouble located so far out from the exchange. Upon looking up the record, the number of the pole at that point can be ascertained and a lineman sent to the very pole in question. This saves a lot of hunting on the troubleman's part, caused by such indefinite instructions as "the trouble is three miles out." Three "country" miles are often nearer four actual miles. Frequently local distances given in miles, are far from correct, so that the measuring of the line when built, and the numbering of the poles, will save work in the end.

The numbering is done with oil paint and the use of a revolving brass stencil. A box scraper should be taken along to clean a spot on the pole. If desirable, the company's name, or such a legend as "post no bills," can be added to the stencil. Place the numbering at least five feet above the ground, where it can be easily seen by the lineman when walking along the road or right-of-way.

The line foreman's record of material used may be a simple blank book, large enough to slip into the pocket. Each job or line built should be described as to route. In the book should be recorded the amount of work done per day, the character of the work, whether digging, stringing wires, etc.; the material withdrawn from stock and the part of the line upon which it was used; and the amount of material returned to stock. This book may be in the nature of a diary, and should record briefly the day's happenings.

As far as possible identify the price with every article. Make every employe familiar with the fact that supplies cost money. Great savings can be effected by this simple plan.

Men constantly handling quantities of material often forget it costs money, and they grow careless in its handling. This feeling was forcibly illustrated by the conduct of two troublemen recently making repairs to a line. They had removed a span of twisted paired wire, perfectly good except in one place. In cutting out the bad place, one of the men was about to cut out five feet of perfectly good wire, when the other man spoke up and said, "Don't do that, Bill, that twisted pair costs two cents a foot." Immediately the other man realized the money value of that which he was about to throw away, and became more careful. Every piece of material should have a dollar-and-cents value in the minds of the men using it. This is worth more than careful records and red tape for the purpose of "accounting" for eveverything taken out of stock.

Eliminate "red tape." Have every record simple and explain its purpose to the man who is to use it. Many men do not understand why they are asked to keep a certain record. They often think it is only for the purpose of keeping tab on their work or the material they use, and resent the imputation which would naturally follow if such were the fact. Explain to these persons the real reasons, namely; the correct valuation of the line; its cost to the company; the estimate of material necessary to complete future work; and such other reasons as may necessitate records. Soon these men will take a pride in keeping accurate records if they thoroughly understand their functions.

Avoid the use of printed forms having small spaces for filling in the information. A man accustomed to handling tools seldom writes a small hand, nor does he always possess the faculty of brevity. Give him room. With the exception of trouble tickets, there is hardly a form that need be smaller than 8½ in. x 11 in. Allow plenty of room for "Remarks," and encourage the men to write under this heading, items of interest regarding the line. The writer well remembers one house he visited where the family bull dog came near making a meal on him. Upon returning to the exchange and getting out the line record to make a memorandum of the trouble cleared, he saw, written at the bottom in red, "Beware the d— dog," evidently put there by some former victim. Such information as this may properly be put under the heading "Remarks," and will often save an employe time and annoyance.

Place all data, neatly arranged, where it is accessible to those who may need it. Use loose leaf devices or files. There are several concerns that specialize in printing forms for telephone companies from which suitable binders may be obtained.

Provide a suitable place for each man to keep his tools and clothes. It makes a man feel that he is of some use to the company when it gives him a place that is his own. It often inspires him to get some tools to put in his box or locker, and this naturally results in better and more work. Where there are several men, provide a room for them where they can come and go without passing through the operating room or office. Provide this room with water and toilet facilities.

The individual needs of each exchange vary so with the class of service given that any hard-and-fast layout for forms and records is impossible. The forms described cover some points which are often neglected by the smaller exchanges and may be used with profit by them.

The Value of Study.

In addition to a complete set of records, which become more valuable as data accumulates, there should be placed at the disposal of the men, copies of the telephone journals and books relating to the art. Back numbers of the telephone papers, accompanied by an index of various subjects such as "line construction," "instrument circuits," "switchboards," etc., are particularly valuable, more so than a miscellaneous collection of books.

Such books as are selected should be of recent issue,

that is those published or revised within a year or so. Books published abroad are not of much practical value in the United States, owing to the difference in materials and methods used. Many of these foreign books are valuable to those desiring to study the theoretical side of the subject. It is difficult to offer a selection of books. But, to secure copies of all of the recent literature relating to the art, would not represent an outlay of over $25. A card record can be kept by the manager or other responsible party. For each book a card should be provided upon which to write the name of the person to whom it is loaned. If this is not done, the library will soon be depleted.

In addition to the books and papers, a monthly or weekly meeting may be held at which topics of interest are discussed. More can be taught the young men about locating instrument trouble in an hour by actually taking on instrument apart than they could learn in a week by study. Nothing is required except a blackboard and a little time. Wherever there are three or more men employed, these meetings should be held.

Often managers complain that they cannot get competent troublemen, or about the "dumbness" of some employe. How much interest does such a manager take in providing employes with facilities for obtaining information that will brighten them, and make them more valuable to the company? Too often the men are so situated that it takes them months to acquire knowledge that, with a few books and papers and a slight amount of instruction, they could get in a few weeks.

A case in point happened in an exchange, where for three years, whenever it was necessary to splice a lead covered, paper insulated cable, a cable splicer was obtained from a neighboring town. No one (the company had two linemen) dared tackle the job. Finally a new hand was taken on, a boy of about 18, who knew nothing of telephone work. This boy saw in TELEPHONY the name of a telephone book which he purchased. As the cable matter happened to come up again at that time, he read about cable splicing. He obtained a four-foot piece of cable and practiced making the splice. Then he started, with the assistance of the local plumber, learning to wipe joints on an old lead pipe. He afterwards tested joints with water under pressure, on the theory that if no water came out, none would go in.

In three weeks this boy was ready to splice cable and said so. The manager of the company laughed at him, whereupon the boy took him to the scrap of cable, nicely spliced and tested. Finally he was allowed to attempt a real splice, and his work was entirely successful, but his companions could not understand how he "got on to" the work. Of course there are "kinks" in all work and practice only will make one perfect. Beware the theoretical man whose only knowledge is from the book, but encourage the one who reads and then practices, who combines theory and practice.

THE VALUE OF PHOTOGRAPHS.

Photographs are of great value in instructing the men, and are the best form of record which can be had of certain kinds of work, such as terminal poles, distributing boxes, etc. A 4 in. x 5 in. hand camera will do good enough work. If a certain installation is particularly good, photograph it and see that every installer gets a print. If a certain cable box arrangement proves particularly convenient, make certain that every man becomes familiar with the arrangement so it will be used whenever possible. The cost of photographs of this description is very slight, and is much less than that for drawings. To make the photographs to scale, simply place a foot rule against the object, for example, a cable box. Its dimensions can then be ascertained by measurement with dividers.

MAGNETO VS. COMMON BATTERY.

Before concluding the general remarks regarding organization, development, and systematic planning of details, it is advisable to consider the type of system best suited to the needs of the small town. This question should be definitely decided as early as possible, as it seriously affects the layout.

In most small towns adjacent to a city having a common battery system, a demand will be made for the common battery service, the citizens being quick to appreciate the advantages of calling central without turning a crank, and not having to "ring off" at the close of conversation. This demand was so insistent that many of the manufacturing companies furnished a magneto telephone in a so-called "central energy" or "common battery" type cabinet, so that the magneto telephone would resemble the familiar common battery wall set in appearance. This also enabled the sets to be rewired for common battery use should the system be changed at any time. Magneto switchboards of the "convertible" type were also offered. They were adapted to be changed for common battery service by simply installing the necessary additional equipment, all wiring for it being initially provided. With such equipment available doubtful situations can be easily handled, being installed magneto and later changed to common battery.

The exact size of the system which is most economical to operate magneto or common battery depends somewhat upon local conditions. Small exchanges of 200 lines, where the future growth will be slow, should be magneto. Between 200 and 500 subscribers, the length of the lines, number of rural circuits, trees liable to cause line trouble, amount of cable plant, etc., determine the type, while for exchanges over 500 lines there is little question as to common battery being the better.

(To be continued.)

Proposed New Telephone Lines in Brazil.

According to the Review of Rio de Janeiro tenders are being called for establishing telephonic communication between Rio de Janeiro and Sao Paulo, Brazil, taking in various cities on the way which so far are not in communication with either. It will be a very great boon when such a line is established, for the growing trade and commerce between the two great cities certainly calls for an improvement of this nature. The distance is not more than 310 miles, so that, considering the long distances spoken over in the United States, the task of establishing communication over such a line should not be very difficult. The only thing is that charge per call is sure to be very large and the line will for a time, it is presumed, not give a very large return. Rio is already in communication with Petropolis and Nictheroy, but the advance to communication with Sao Paulo will be very great.

TO INDEPENDENT AND BELL COMPANIES.

In connection with the information we are now gathering for the forthcoming edition of TELEPHONY'S Directory of the Telephone Industry, we are compiling certain additional and unusual statistics. To the end that this data may be comprehensive and as complete as possible, we ask every telephone company to mail us a copy of their latest directory. We trust all will respond promptly, and assure each of you that the courtesy will be appreciated. Please address it to TELEPHONY, Monadnock Block, Chicago.

Queries on Theory and Practice

Reason for Voltmeter Readings.

"Our voltmeter gave some queer readings the other day and I would like to know how they happened. Enclosed find a rough diagram which shows how the circuit was arranged. I was using two telephones, *A* and *B*, on battery of different voltages. *A* was on 22 volts and *B* on 48 volts. There was a tap taken off the 48-volt battery to get the lower voltage for the time being. A voltmeter was wired to the plus wire with a single pole, double throw

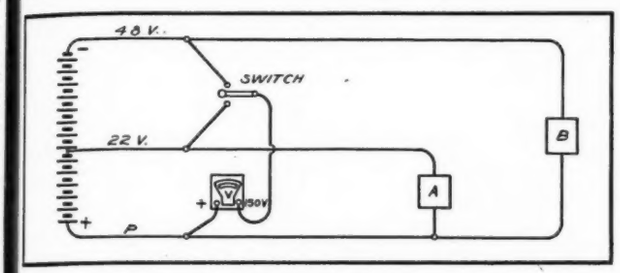


Fig. 1. Two Telephones Fed from one Battery.

switch to test the high and low voltages. It worked all right for a time when the *A* telephone went dead. Trying the voltage, the 22-volt point gave about one volt backward, and the 48-volt point was about 26 volts in the right direction. After stirring around I found the wire broken off at *P*. Fixing that trouble cured the whole thing. But why did the needle go backward?"

The break at the point marked *P* on the sketch, Fig. 1, placed the two telephones in series with each other and made the voltmeter read the voltage across each, according to the way the switch was thrown. It caused that part of the battery. When the switch is thrown to the left, to supply the current to the telephones, reversing the direction of the current in the *A* telephone, but leaving it in the same direction in the *B* telephone. Fig. 2 shows the case in a simpler way, being merely the circuit which you had put into such a form as to show the fall of potential relation.

The voltmeter is left connected by its plus terminal to the point between the two telephones. The switch can connect the negative or 150 volt end to the right or to the left. To the right, it will measure the fall of potential or voltage across the *A* telephone, which will be negative since the current flows as arrowed from the middle of the battery, through the telephones to the negative end of the battery. When the switch thrown to the left,

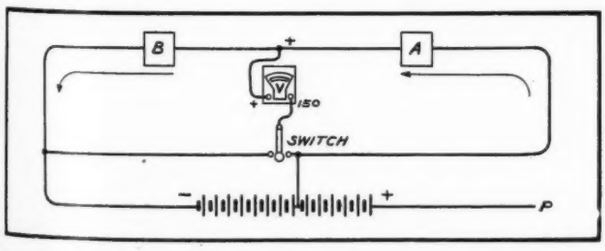


Fig. 2. Diagram Showing why the Needle Kicked Back

it puts the voltmeter in parallel with the *B* telephone with current flowing the right way through the meter.

Adding the readings which you have given, checks this up fairly well. One volt across the *A* telephone added to the 26 volts across the *B* telephone gives 27 volts, which should be the voltage of that part of the battery between the middle tap and the negative end, 48 — 22 = 26 volts. This is one volt less than what it should be from the above addition, but it is likely that this is due to errors in reading.

Some Toll Line Difficulties.

"We have a toll line which has lately given us trouble. Can you tell us what the trouble is? The line is of No. 12 wire with four stations on it. I am enclosing a drawing showing the arrangement. *A*, *B*, and *C* can ring each other, *C* can ring *D*, and *D* can ring *C*, but can not ring *A* or *B*. From *A* to *B* the distance is 12 miles and from *C* to *D* it is 4 miles, and from *D* to *A* or *B* is 20 miles."

The diagram which was enclosed is reproduced. The trouble amounts to satisfactory operation between all the stations except with *D*, and it is able to carry on business with its nearest neighbor, *C*. There are two things to suspect, namely, the line and the equipment. You may have a faulty line by reason of a high resistance joint from where the *D* branch leaves the main line to the *D* telephone. There may be a weak telephone at *D*, one which is weak in both generator and bell. Such a combination sometimes occurs.

If there is a marked difference in the strength of telephone *D* from all the others, we may suspect a leak on the line. It

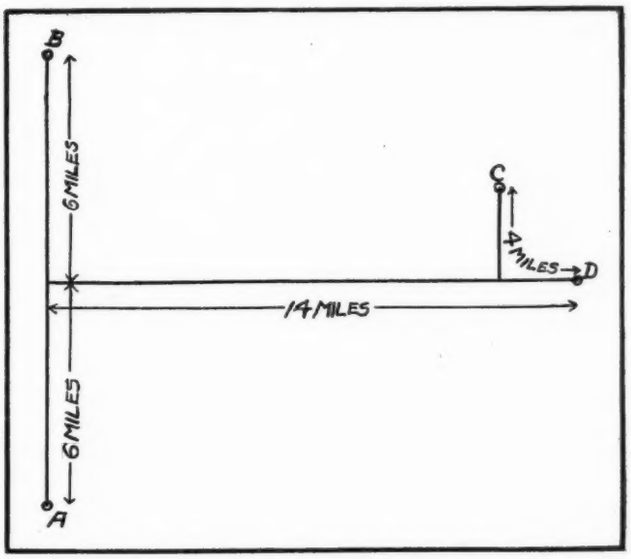


Diagram Showing Layout of Toll Line.

may not be serious enough to put the other telephones out of service, but just bad enough to prevent the weak telephone from ringing beyond its nearest neighbor. We often have had cases of trouble which acted in this way.

Transposition of Circuits on Poles with Grounded Lines.

"I wish to know how to transpose a metallic circuit of No. 12 B. B. iron wires, that is on a pole line with two grounded circuits of No. 12 iron wires. One grounded circuit runs four miles and branches off to another line. The other grounded circuit runs the whole length of the eight miles to an adjoining town. From this town I will extend the metallic circuit eight miles to another town, with no grounded lines. Please give me the proper transpositions for this metallic circuit."

For the case which you have described, we advise that you transpose every mile, regardless of the presence or absence of other circuits. This is sufficiently often to neutralize any tendency to cross talk, unless it comes from leakage. Keep the lines well insulated from everything and, with the transpositions every mile, you should have no trouble.

Abstract of Report on Situation of Chicago Bell

An Investigation Made for the Chicago City Council Committee on Gas, Oil and Electric Light to Furnish Data Upon Which to Base New Telephone Rates for Five Year Period, as Prescribed by City Ordinance—Second Installment

By Prof. Edward W. Bemis

Decline in Maintenance.

While there have been frequent fluctuations from year to year in the percentage of actual expenditures for repairs and renewals to the investment for the year, there has been, on the whole, a steady decline in this percentage. It is best shown in the following way:

During the first three years of 1891-1893, inclusive, the total expenditures for maintenance and reconstruction were $731,949.35, and the sum of the average investments of the three years was $7,804,971.31. The percentage was 9.38. Then in the same way the percentage can be found for 1892-1894, inclusive, 1893-1895, inclusive, etc., down to and including 1910-1912, inclusive. In the same way a five year period may be taken, beginning with 1891-1895, inclusive, following with 1892-1896, inclusive, etc. Finally, a seven year period may be taken, beginning with 1891-1897, inclusive, etc. The results are tabulated in Table No. 5.

Last Year of Period.	One-Year Period.	Three-Year Period.	Five-Year Period.	Seven-Year Period.
1891	10.53			
1892	9.88			
1893	8.33	9.38%		
1894	9.44	9.17		
1895	10.86	9.62	9.78	
1896	9.49	9.93	9.63	
1897	7.55	9.21	9.11	9.30
1898	8.74	8.58	9.14	9.11
1899	3.35	8.24	8.90	9.00
1900	11.55	9.74	9.34	9.52
1901	8.54	9.48	9.09	9.30
1902	8.56	9.34	9.11	9.00
1903	8.89	8.69	9.09	8.94
1904	6.93	8.06	8.59	8.58
1905	9.01	8.28	8.37	8.66
1906	7.26	7.73	8.07	8.39
1907	9.81	8.75	8.46	8.47
1908	8.64	8.64	8.44	8.50
1909	8.42	8.92	8.65	8.48
1910	7.78	8.26	8.39	8.32
1911	6.95	7.67	8.21	8.18
1912	7.39	7.39	7.77	7.96

Table No. 5. Declining Ratio of Maintenance and Renewals to Average Investment by Groups of Years.

The large jump upward in 1900 was due to the almost revolutionary changes incident to the rapid introduction of ten-party lines and many changes in switchboards.

A smaller impulse appeared in 1907-8, with the discontinuance of ten party lines and with the many other changes that attended the passage of the present ordinance in 1907.

A trend line has been drawn, showing the general tendency. Its prolongation to 1917 reveals 7.5 per cent. in 1912 and 7.2 per cent. in 1917, or an average of 7.35 per cent. as the probable expenditure, yearly during the coming five years, that is, the average percentage of expenditures for maintenance to the average depreciable investment. This closely approaches the average of 7.39 per cent. for 1912 and for the three years 1910-12, inclusive, and 7.59 per cent. for the four years 1909-12, inclusive.* It therefore seems fair to assume 7.5 per cent. as a conservative percentage for maintenance for the next five years, unless the causes of the present conditions cease to operate, or are counter-balanced by other influences.

*Detailed computations for four-year period are omitted.

In his annual report, January 18, 1899, John M. Clark, the then president of the telephone company, anticipated the decline in maintenance, when he wrote: "The business is still to some extent in the experimental stage, but it is confidently believed that that stage will soon be passed, and that when the various kinds of apparatus which are required shall become standard, when new and expensive switchboards will not become obsolete within two or three years from the date of their completion, that a better service will become possible, and that lower rates may prevail in the interest of the subscribers and in fairness to the company."

The following table, No. 6, gives the separation that has been made on the books of the company between repairs and reconstruction since the attempt was made to keep them separately in 1904.

This matter of increase of life and reduction of repair and renewal charges is so important that further discussion of the subject is desirable.

This is especially true in consequence of the elaborate studies that have been recently made by the company to show the probable upward trend of maintenance in case of a great reduction in the rate of growth and no increase in the length of life of the telephone plant.

It should be noted, however, that a reduction in the rate of growth will check that large source of present maintenance charges, viz., the necessity of tearing out good cables and switchboards to make room for larger ones.

Inadequacy in the telephone business is an important cause of expenditure for maintenance. The slower the growth, the fewer would be the 100-pair and 300-pair cables pulled out to make room for 600-pair cables, and the less would central stations have to be enlarged and built to make room for more switchboards.

Similar Tendencies in St. Louis.

The Bell Telephone Co. of Missouri has a property whose present physical value in St. Louis and other parts of Missouri, has recently been reported by the well known engineering firm of Westinghouse, Church, Kerr & Co., as about $7,000,000. An appraisal by these engineers and a report by the accountants, Haskins & Sells, was made on March, 1911, to a committee of the board of directors of the Missouri company. It is shown that the total expenditures for maintenance and renewals, 1901-10, inclusive, fell from an average of 7.71 per cent. of the value of the depreciable property, during the

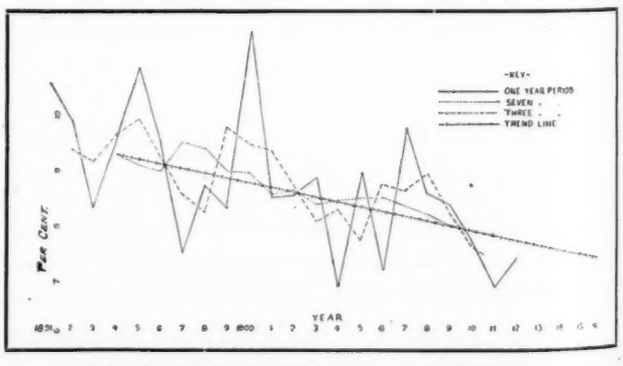


Fig. 1. Ratio of Maintenance to Investment.

first six years, to 5.65 per cent. during the last four years of the ten year period. Haskins & Sells thus discussed the matter.

"Throughout the ten-year period, the annual average has amounted to 6.46 per cent. of the value of the depreciable property and 24.61 per cent. of the gross earnings. The decrease during recent years in the relative amount of these expenditures is the natural consequence of the improvement in the character of construction which has taken place within the last ten years, such as the use of conduits, installation of cables—underground and aerial—and the increased stability of the the art of telephony."

Changes in the Art.

A review of the development of the company indicates that far greater and more revolutionary changes have taken place in the past than are likely to occur in the future. Switchboards and subscribers' stations may change, but conduits and cables have come to stay. The repair of all classes of telephone property is admittedly less expensive than formerly. Some illustrations will make this clear:

Aerial construction: All telephone transmission prior to 1884, was upon poles, in the outlying districts of the city, and on the housetops in the business districts. Later all the wiring was placed underground.

These changes were brought about not only by the requirements of the city ordinances, but also by the discovery by the company that with improved methods of burying the wires, and the ability to place several hundred pairs of wires in a single duct and with the avoidance of injury from sleet storms, mischief-makers and other troubles, conduits were cheaper in the city than pole lines. Even the wires that do remain upon poles within the city, are mostly not part of the original pole lines, but are short stretches in alleys.

The change has been less rapid in the suburbs, yet in the territory as a whole the percentage of open wire on poles declined from 84 per cent. of the total wire in use in 1885 to 8 per cent. in 1911. Within the city less than one per cent. of the mileage is open wire.

Conduits: The original conduit installation, of any magnitude, was in 1884. The history since then may be divided into seven chapters:

1. The original installation of the so-called Dorsett conduit of 6 in. compound duct. It was in 3-ft. lengths, and made of a composition of tar, sand and cement. It was divided into two halves by a horizontal shelf partition or covering. Manholes, consisting of a cylinder four feet in diameter, with a bell-shaped top, were built of the same material, and located along the line of the conduit, 300 or 400 feet apart.

2. The Brooks conduit, in 1886, of steel pipe from 2 in. to 4 in. in diameter, with splicing boxes at various intervals, in the form of a ball.

3. A square trough, about one foot on each side and about half filled with sand and cement.

4. A vitrified tile duct, in 1889 and 1890, 3 ft. long and 10 ins. square, with a horizontal dividing shelf, known ordinarily as 10 in. x 10 in. This conduit was laid in a rough support at the joints upon bricks, the joints being covered by a cemented burlap bandage. Brick manholes, generally square, were constructed; some small concrete vaults were also built. These are the first conduits of which any sections remain. At the close of 1888, 3,127 miles of wire had been laid underground.

5. Cement lined iron pipes, consisting of a 3 in. tube of stovepipe sheet iron, lined with cement, was the next improvement after 1892. At the same time creosoted wooden pump log, resembling but inferior in various points to a somewhat similar construction today, was also introduced at this time.

6. In 1896 the 10 in. x 10 in. single duct vitrified tile, known as Camp tile, came into use. The duct was surrounded by a concrete envelope.

7. In 1900, the McRoy or multiple duct, likewise a vitrified clay product was introduced, and later it came into general use. For several years it has been the standard duct, and little improvement is considered likely.

The Dorsett conduit contained one, two and sometimes three small cables. For an outside protection the whole was wound with hemp, which was impregnated with an asphaltum mixture.

After the cables were pulled into both the Dorsett and the Brooks conduits, from 1884 to 1888, the entire conduit was filled with oil. The cable itself was boiled in kettles of hot oil. These kettles, with the necessary fuel for heating, were carried from place to place. After the cable was installed, in this expensive and difficult manner, no access could be had without excavation. There was a great objection among the people and the city authorities to the smoke and stench coming from the oil. It was with great difficulty that the men were permitted to do the work except on Sundays or at night.

Years.	Repairs.	Percentage of Repairs to Average Investment.	Reconstruction.	Percentage of Reconstruction to Aver. Investment.
1904	$ 1,008,730.56	6.34	$ 94,240.18	0.59
1905	1,144,847.97	6.61	415,947.12	2.40
1906	1,274,071.10	6.44	161,369.59	.82
1907	6,796,855.29	7.63	514,448.76	2.18
1908	1,306,415.07	4.97	965,292.04	3.67
1909	1,421,313.66	5.12	915,193.81	3.30
1910	1,769,706.64	5.93	553,647.14	1.85
1911	1,815,292.40	5.45	498,304.72	1.50
	$11,537,259.69	5.96	$4,118,443.36	2.12
1912*	2,073,760.68	5.55	686,070.00	1.84

*Based on the first six months.

Table No. 6. Repairs and Reconstruction Since 1903.

About 1888, a lead pipe armor, or protection of the hemp and tar compound, both for aerial and underground cables, was introduced. The cables, with their wires insulated with cotton were drawn by hand through 50 to 100 feet sections of these lead pipes. The sections were then soldered together by a plumber, and the entire cable subjected to heat, filled with hot paraffin, sealed, wound on a reel, and made ready for shipment.

Cables: While revolutionary changes were taking place in the poles, conduits and wires, an equally important change was taking place in the grouping of wires into cables for installation upon pole lines, or to a vastly larger extent, for insertion in conduits.

1. Cables of 20 No. 18 gage rubber covered, untwisted wires, introduced in 1884, in the Dorsett circuit already described.

2. Cotton insulated, straight wires, pulled into the Brooks circuit of wire pipe, 1886, filled with hot oil, as already described.

3. The introduction of a lead pipe covering, in 1888, to protect the wires against moisture and other damage, in both aerial and underground cables. Untwisted cotton insulated wires were wound with string into a tight cable, and then pulled into the lead pipe, which was then filled with hot paraffin. The cable was exceedingly noisy, and not at all practicable. The pulling of these cotton insulated wires by hand, sometimes 90 pairs at a time, into 50 or 100 feet sections of lead pipe at the factory, before insertion of the hot paraffin was a tedious job.

4. Twisted pair cables appeared in 1892, and were the next improvement. But the cables were solid and inaccessible, the location and removal of trouble was unsatisfactory and expensive.

5. The present day type of paper insulated, twisted pair cables was developed between 1892 and 1895.

6. Increase in the number of pairs possible in a cable and therefore in the duct of a conduit. The increase was from 90 pairs in the 80's to 120 pairs of No. 19 cable in 1892, 400 pairs of No. 22 gage cable in 1900 and 600 pairs of the same cable in 1904.

(*Continued on page* 779.)

Out of the Mail Bag

William E. Bowers is manager of the New Haven exchange of the Home Telephone & Telegraph Co., which operates exchanges at Fort Wayne, New Haven, Kendallville, Auburn and Sturgis, Ind. In a recent letter to TELEPHONY, renewing his subscription, Mr. Bowers says "My telephone experience commenced in 1905 while publishing a weekly newspaper. I was always glad to hear a subscriber say something when renewing his subscription, whether complimentary or not, and the publishers of TELEPHONY are unnatural if they are not gratified along the same line. I read every word every week of your paper, advertisements and all, for the entire contents of TELEPHONY are educational. I invariably read Kelsey's articles first. Assure him that he is on the right line."

Mr. Bowers has us "sized up" right. We do like to have our readers say something about the paper, and we also plead guilty to preferring to have that comment be complimentary. At all events, we like to have some opinion expressed, for if TELEPHONY can be improved—and what human product cannot be made better?—and any reader can point the way, the publishers certainly will welcome the information. It is gratifying to know that the advertising pages are read, too, for as our correspondent says, they are educational.

The Financial Editor at Play.

"I desire to express my appreciation of TELEPHONY and to wish for it continued success and prosperity," writes Houck McHenry, secretary and treasurer of the Capital Telo Co. of Jefferson City, Mo. Mr. McHenry is a pioneer in the telephone field and was formerly president of the Missouri Independent Association.

"Your publication is first class and worth much more than the subscription price," writes N. J. Jones, secretary of the Shelby (Iowa) Independent Telephone Co.

A. A. Montour, manager of the Luana-Monona Farmers' Telephone Co., at Monona, Ia., writes in his letter subscribing for TELEPHONY: "In view of the fact that there is so little good telephone literature on the market, I consider your offer extraordinary as I find in your paper hints that are necessary to all men in the telephone field."

It will be remembered that some time ago TELEPHONY sent out a number of desk clocks to its friends. The timepiece that found its way to the office of L. B. Allen Co., manufacturers of the well-known Allen-Flux, loafed on the job and had to be sent back for repairs. "If it is going to be any trouble at all to have it fixed, don't bother," writes L. A. Husak, assistant secretary of the company, "as we have a good time-piece in the office now, and anyhow *we don't need a clock to remind us of the good work* TELEPHONY *is doing for us.*

W. H. Wilson, formerly with the American Union Telephone Company at Philadelphia, has taken charge of the Union Telephone Company at Erie, Pa., as general manager, and writes TELEPHONY: "I cannot get along without your valuable paper, so please send it to my new address."

J. D. Wimp, manager of the Shelby County Telephone Company, at Shelbyville, Ky., writes: "I subscribed for TELEPHONY some time ago. Of course, we do not want to be without it, for our friend Kelsey's letter alone is worth the price several times over."

In writing in to have his address changed, J. R. Spring, manager at Portsmouth, Va., says: "I wish to compliment you on the valuable publication that you are putting before the telephone men. There is not a week that I do not find something of interest and help to me in your journal. I am to leave here shortly to enter the electrical construction business, but I still want TELEPHONY as it seems like an old friend. I wish you continued success."

L. M. Wormuth, the new wire chief for the Federal T. & T. Company at Rush, N. Y., writes: "I consider TELEPHONY fine and as I am a new-comer in the wire chief's end of the game I am much interested. I learned a volume in the few copies I have already received."

"Enclosed find draft for another year's subscription to TELEPHONY," writes J. E. Green, of Grinnell, Iowa. "I think there is nothing like it in the telephone world. Can't afford to be without it."

In renewing his subscription, A. Hester, proprietor of the Hester Telephone Company of Dierks, Ark., writes: "We cannot get along without TELEPHONY here."

J. C. Kelsey, whose articles in TELEPHONY have proved so popular, recently spent ten days at his old home in Hiawatha, Kansas. As is the case with all real men, fame, prosperity and the busy years spent in climbing upward in the big world have not diminished Kelsey's liking for the "old town." As James Whitcomb Riley has said: "The little town of Tailholt is good enough for me." The Hoosier Jim and the Kansas Jim feel alike about the joys of the home town. So when Kelsey went home, he "shucked" his coat, forgot, for the time being, his Chicago ways and harked back to the days when he was a husky lad. Just to go the distance he tackled the old buck-saw and several cords of stove wood, and he soon found that this occupation produced more blisters on his hands than either capturing a switchboard contract or writing his weekly article for TELEPHONY. The accompanying photograph shows Kelsey after a half hour's labor had convinced him that comfort demanded the discarding of more than his coat. The Hiawatha Democrat, the local paper, printed a paragraph about the visitor being "in their midst," and ended it by saying, "he's the same old Jim." Whether the editor reached this conclusion after sizing up Kelsey *en deshabille* is a question. Maybe they were boys together, and Kelsey at the wood-pile looked something as he used to at the old swimming hole.

A Year or So Ago There was a Real Sleet Storm

Some people described it otherwise, but heat and sleet don't mix. So it wasn't a good description.

Before it ended a lot of companies were out of business and some of them never got back in.

They had a real interest in "scrap value"—the others only a passing interest.

But at that, it's a good bet that not a single company using Copper Clad had to quit business, because when you have *some* lines left, you get enough encouragement to restring the others.

Trade Mark
"Weld Clad"

Duplex Metals Company

Chester, Pennsylvania

CHICAGO OFFICE
853 Peoples Gas Bldg.

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Girl is holding No. 1 Model

Send for either outfit. Give it a trial by putting out an oily waste fire in a tin pan or pail, and convince yourself of its positive merit.

Address the nearest Liquid Branch

BUILT BY

"The Liquid" Carbonic Company

JACOB BAUR Pres. and Treas.

CHICAGO Pittsburg Cincinnati New York Milwaukee Boston Minneapolis Atlanta St. Louis Kansas City Dallas San Francisco

Some Ways of Putting Out a Fire Do More Damage Than The Fire Itself

If you have ever seen a fire you know how much damage water does and how bad a mess a chemical fire extinguisher leaves in its wake.

But the Diamond Liquid Carbonic Fire Extinguisher Does NO Damage

It puts out the fire by choking it to death with an invisible, odorless, harmless gas (soda water gas) and it does it INSTANTLY.

The DIAMOND extinguisher is a fire department in a portable tank. The tank contains carbonic gas in liquid form, under great pressure. Open the valve and the liquid expands into gas, rushing out through the nozzle with great force—ice cold.

The gas puts out the fire because it deprives it of air and oxygen and when the fire's out there's no muss to clean up.

SIZES AND PRICES

No. 1, 20½ inches high, round bottom. Holds 4 lbs. of Liquid Carbonic Gas. Complete with hose and couplings, F. O. B. Liquid Branches $12.50

No. 2, 28 inches high, flat bottom. Holds 6 lbs. of Liquid Carbonic Gas. Complete with hose and couplings, F. O. B. Liquid Branches 15.00

Refills, at any of the Liquid Carbonic Co.'s branches:

No. 1, each ..... .75

No. 2, each 1.00

Booklet free

No. 2—28 inches high. 6 lbs. of gas.

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Of Dry Cells
Are Handled In This Territory

FRENCH Telephone Cells

Are Manufactured and Shipped
Direct from Madison, Wis.

There is no reason why the dry cells *you* use should get old in transportation and stock rooms before you install them.

Your orders will be shipped the day received.

Send for new price schedule.

FRENCH BATTERY & CARBON CO.
Madison, Wis.

OSHKOSH

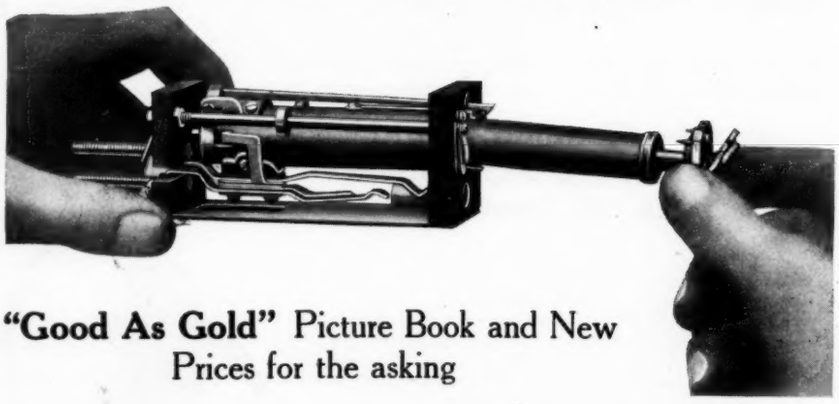
Folding Take Up Reel

A neat well made device—can be quickly handled and is thoroughly practical. When coil is made remove pin in shaft—the coil comes off and the reel folds up. Can be easily carried on one arm or packed in trouble wagon taking up very little space.

This improved reel with its special features costs no more than inferior reels. *Why not give it a trial?*

Oshkosh Mfg. Company
Box 682 **Oshkosh, Wis.**

"SWEDISH-AMERICAN" is the answer to your question of QUALITY



The only Magneto Switchboard having **Self-contained** Drop and Jack with removable coil from the **front.**

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CANADA TRADE
will be supplied
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"Good As Gold" Picture Book and New Prices for the asking

The SWEDISH-AMERICAN TELEPHONE CO. is no longer associated with the DOMINION TELEPHONE MFG. CO.

"Hercules" Telephones have stood the test of time.
Don't be fooled or misled by offers of second-hand Drops.
Deal **direct** with **headquarters** and get the latest **improved** kind.

SWEDISH-AMERICAN TELEPHONE MFG. CO.
5235 E. Ravenswood Park, CHICAGO, ILL.

REPORT ON CHICAGO BELL COMPANY.

(*Continued from page 777.*)

7. Loading coils, in 1906 and 1907, and the installation of special toll cables of large gage conductors, were some of the most recent steps in the evolution to the present type of cable, which, like the type of wire and of conduit, appears to have reached a point of slow advance instead of the progress by leaps and bounds that had been going on up to about five years ago.

Central Office Switchboards.

1. The telegraphic switchboard, adapted for telephone use. In this board, in 1880, the telephone operator at the central office received the call for a subscriber on a tape register. He would then connect his telephone with the subscriber's line and ask what was wanted. The whole process was tedious

2. The subscriber was given a means of signaling the operator direct on the same wires that he talked over.

3. The multiple switchboard was invented in the later 80's, and one of the largest of its kind, at the time, was installed in Chicago.

4. The so-called "Express" board, invented about 1894, partly displaced this magneto board. Lamp signals took the place of drops, and the so-called Fuller battery, at the subscribers' instrument, was replaced by a storage battery located at the central office. The subscriber could now signal the operator by merely removing the telephone transmitter from the hook, instead of turning the crank, as in the magneto system.

5. The present type of relay common battery switchboard was invented about 1898, but so many improvements were subsequently made, up to about five years ago, that it has been necessary to reconstruct most of the earlier switchboards of this type.

These various improvements reduced the average time necessary for making connection for calls, according to President Sunny, from 90 seconds in 1886 to 18 seconds in 1908. This has, of course, been accompanied with a large reduction of expense of the operator's time in handling messages.

If the semi-mechanical system now in operation in the big laboratory building of the A. T. & T. and of the Western Electric in New York shall prove the success it promises, it will be used for new central stations and will justify its introduction by the large decline it will effect in the number of operators and in other costs.

Wire.

1. *Iron wire.* Prior to 1890 practically all the wire used in the outside plant was No. 12 iron.

2. *Copper wire.* About 1890, when 15,000 miles of wire were in use, copper wire began to supersede iron wire, although there was a short interval in which trial was made of some phosphor bronze wire.

3. About 1892, owing to the interference of the high voltage of electric railways and lighting plants, the telephone company began to change its single wire copper lines to two-wire metallic circuits. Each of the above transformations, from iron to a single copper wire, and then to a two-wire circuit involved a complete transformation of the wire system.

The telephone ordinance compels the company to place and keep in underground conduits all its wires from the Chicago River on the north to Twelfth street on the south, and from Lake Michigan on the east to the south branch of the Chicago River on the west, while in nearly all the rest of the city it must place all its wires underground, with the exception of wires not to exceed two blocks in length from underground connections to subscribers stations. Even these wires cannot be placed on poles on streets if there are alleys.

In a general way it may be said that the Chicago Telephone Co. can only use pole lines north of Howard avenue, west of Western avenue and Fortieth avenue, and south of Seventy-ninth street. The exact boundaries are to be found in paragraph 10 of the ordinance of 1907.

Proportion of Property of Long Lived Construction.

At the close of 1895 only 50 per cent. of the wires in the Chicago telephone territory, city and suburban, were under ground. At the close of 1905, 64 per cent.. were under ground, and at the close of 1911, 81 per cent. were under ground.

So great, however, has been the reduction in the cost of construction per foot of conduits and cables that the proportion of the entire investment in land, buildings, right of way, and under ground construction, exclusive of toll properities whose data is not fully available, has only increased throughout the Chicago telephone territory from 37.6 per cent. of the total, in 1891, to 40.1 per cent. in 1911, and in the city the increase has been from 39 per cent. to 43.9 per cent. These figures are readily computed from the data given in Mr. Hall's Exhibits B, C and D.

The life, however, of both conduits and cables has itself so much increased that the real average life has undoubtedly increased much more than is indicated by the above figures. The cost of repairs, as already remarked, has undoubtedly declined with the growth in the art. This view is confirmed by President Vail, of the A. T. & T. in his report for 1910. (Page 7.):

"The present policy of the Bell system is to provide against every probable contingency and to base the amount and extent of such provision on past experience—not on future expectations. It is conjectured that the future will show a decrease in the depreciation or reconstruction due to decay, wear and tear, and obsolescence. Changes—improvements—are going on as rapidly as in the past, but the general character of plant and methods is assuming more permanency. The improvements are being evolved from and are being grafted on to the old system and methods. The disturbing and sometimes seemingly destructive conditions following the rapid development of high pressure power and transmission have been to a great measure overcome.

All this has been made possible through the unremitting study and research of the staff of the engineering and experimental departments of the company, who, by close attention, observation and study, anticipate and provide for all such contingencies and conditions as can possibly be anticipated or provided for in advance.

Under these conditions there is small probability that any such causes as those which forced the wholesale reconstruction or re-arrangement of plant in the past will again occur; it is, however, for the benefit of the public and of the corporation to have an ample reserve for any contingency which may happen."

The Company's Depreciation Reserve.

The Chicago Telephone Co. has collected from the subscriber and set aside as a depreciation reserve, a further sum of $5,091,823.19 to meet depreciation that may be revealed at some time in the future. Of this fund about $2,241,141 was set aside in 1910 and 1911. This depreciation, assumed to exist after all current expenditures for repairs and renewals may be called residual depreciation. The property of the company on January 1, 1912, had been built up from the following sources:

First mortgage 5% bonds	$ 5,000,000.00	
Loans by banks	1,000,000.00	
Capital stock	27,000,000.00	
		$33,000,000.00
Depreciation reserve	$ 5,091,823.19	
Insurance fund	307,548.21	
Other reserves	244,735.49	
		5,644,106.89
		$38,644,106.89

In addition to the above, current assets of cash, bills, accounts receivable and prepaid expenses amounted to $1,690,067.42 but these were balanced by current liabilities of accounts payable and accrued liabilities not due, amounting to $1,886,285.34. Leaving out of account these latter items of cur-

rent assets and current liabilities, which virtually offset each other, there remains as just stated two chief sources of the property of the telephone company, to-wit: $33,000,000 furnished by the stock and bond holders and banks, and about $5,650,000 supplied by the telephone users, in order to keep the investment of the stock and bondholders intact.

The question will later arise whether the $27,000,000 supplied by the stockholders came in part from earnings in addition to large dividends, but that problem does not arise at this point.

The depreciation reserve above referred to is not the only amount that the company set up in the past as representing depreciation. From 1894 until 1907 the company, after distributing dividends of 10 per cent. had charged to operations $3,767,233.55, which was written off the plant account. Early in 1908 the company appears to have concluded that the property had not depreciated to any such extent. The whole of this $3,767,233.55 was transferred to surplus, leaving the plant account as it would have been without any such deduction. This credit to surplus formed the basis of the stock dividend of $4,500,000 in that year. Not only was the above amount of $3,767,233.55 charged to operations and maintenance, but it has been shown that an additional amount of $1,575,000 was charged during the above period as maintenance, which likewise eventually found its way into the surplus. (Hall, page 20.) The total amount thus included in operations, purporting to represent a provision for depreciation, or for deferred maintenance, but which was diverted to the benefit of the stockholders, was therefore $5,342,233.55. The dividends were indeed reduced in 1908 from 10 per cent. to 8 per cent. so that the total dividends were not materially changed. But in so far as an 8 per cent. dividend is less subject to public criticism and less liable to reduction in a change of rates than is a 10 per cent. dividend, the stockholders gained.

In another way, they also gained. By writing up the plant investment several million dollars, the justification for the increase of stock and for a profitable return thereon, was given to the public.

The important feature of the transaction was the revelation that the company considered that there had been less depreciation by $4,845,000, than the books have hitherto shown. Consequently the telephone users, in paying such charges as to permit the accumulation of that fund, in reality had not been accumulating a fund with which to meet depreciation, but had been increasing the profits of the company, which the latter had invested as surplus in extension and then capitalized.

Naturally, such a transaction makes one a little critical with regard to the new accumulation of $4,971,823.19 in one depreciation account and of $120,000 in another.

(To be continued.)

The Propagation of High Frequency Along Wires

Some Practical Aspects of High Frequency Multiplex Telephony and Telegraphy—Its Relation to Radio-Telegraphy and Radio-Telephony—Advantages Over Existing Telephone Systems—Reprinted from The Journal of the Franklin Institute—Third Instalment

By John Stone Stone

A most important feature of both existing telegraphy and telephony is the centralization of the current supply, and this feature is fortunately most easily realized in the new high frequency telegraphy and telephony. It brings the high frequency generators, whether they be high frequency dynamos or oscillators, under the constant supervision and care of a trained man at the central office. The author has devised several ways in which the centralization of the energy may be practically accomplished. Only two of these ways need be referred to here. In the first, the high frequency generators are connected in series in the circuit at the central office, and each is shunted by a number of branch resonant circuits. Each branch circuit is separately made resonant to a different one of the several frequencies of the currents used on the line other than that of the current developed by the

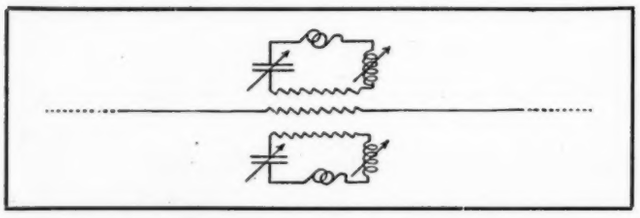

Fig. 6. Arrangement for Centralizing the Energy.

generator it shunts. Another practical mode of centralizing the energy is shown in Fig. 6. The several generators, each in a local circuit tuned to its own frequency, are brought into inductive relation with a transformer secondary in series or in parallel with the telephone or telegraph circuit. The generators in the centralized energy system develop higher potentials than those designed to be used at substations, or else the voltage of the generator is stepped up to the desired voltage.

An allied arrangement, first suggested by Dr. Louis Duncan, contemplates using the high frequency current only on trunk circuits. In this arrangement, which there is not space here to discuss in detail, a telegraph or telephone relay at the central office translates the telegraph or telephone message bearing current from the existing substation line equipped with its local or centralized battery supply into a high frequency telegraph or telephone current on the trunk circuit, and conversely the high frequency telegraph or telephone current on the trunk circuit is translated from that circuit to the local or substation battery circuit by a telegraph or telephone relay or by a rectifier. It is of interest to note that the most serious objections to the telephone relays lose their force in this application, because the telephone relay so used need not amplify the telephonic transmission, and it is in its function as an amplifier that the telephone relay has met conditions which have brought it into disrepute.

In this paper no more than a passing reference has been made to the extremely important fact that multiplex high frequency telegraph and telephone systems may be superposed on existing telegraph and telephone circuits without bringing about the least mutual interference between the old and the new systems, and this subject and its important practical aspects will not be further dwelt upon here because it has received a fairly complete exposition at the hands of Major George O. Squier, both in his patents and in his paper before the American Institute of Electrical Engineers, to which references have been made. Only such features of high frequency telegraphy and telephony

s have not elsewhere been adequately brought out or dissed so as to make clear their bearing upon the future ractical application of the propagation of high frequency urrents or electric waves along wires will be dwelt upon. his course, though it imparts to the paper a fragmentary haracter and an appearance of incompleteness, serves to eep it within reasonable bounds and should not diminish s utility, in view of the references given to other publicaions.

There is an element of every system of transmitting inelligence, namely, the *call* and its allied automatic circuit ontrol mechanisms, which has been highly elaborated, articularly in the older system of telephony. In the ew high frequency telegraphy or telephony, when used y itself, either as a simplex or multiplex, the *call* and autoatic circuit control mechanism system generally need not e different from that in use today in the older systems. n lieu of this, the call may be effected by a very flexible ystem of selective low frequency electric signaling over he same line. In this selective signaling system, each of a number of stations on the same line is called by the use of a low frequency alternating current of a different frequency thrown on the line. The selection of the signaling current at the different stations called, is effected by electrically reasonant local circuits or branches at these stations, each attuned to the frequency of the particular alternating signaling current by which it is intended to be operated.[17]

The description of this system of selective signaling needs little amplification here, since it has long been known and is discussed in detail in the reference given, as well as in numerous patents to Professor Pupin, Messrs. Hutin and LeBlanc, and to the author. There is just one new feature in the system, however, which should be mentioned, namely, that by the addition of rectifiers in the local branch signal receiving circuits, the author believes that he has overcome the principal hindrance to the practical application of the system in the past. By this simple device the call at each station may be sounded by a vibrator bell of a uniform pattern. There seems little doubt that this extremely simple and flexible selective signaling system would long since have become popular for party line selective calling in the existing telephone system except for the fact that it demanded the use of some special, unsatisfactory, and unusual call device, different at each station.

When the high frequency system is used in conjunction with, and on the same line as, the existing system of telegraphy and telephony, a separate high frequency call or signaling system is preferably used. This call or signaling system is identical with the high frequency telegraph system itself, except that it operates a local battery call device, such as a vibrator bell or buzzer, instead of operating a telephone receiver. For this reason it is necessary that the calling current manifest more energy at a distant station than does the corresponding high frequency telegraph or telephone current under similar conditions. To accomplish this purpose a relay of great sensibility and extreme sluggishness of action is used in conjunction with a rectifier in a tuned local circuit at the receiver station. To call the station, a high frequency current of the same frequency as that to which the local circuit at the receiver containing the rectifier and relay is attuned, is thrown upon the line and maintained thereon until the sluggish relay has time to respond and close the local battery circuit containing the vibrator bell or buzzer.

The relay which the author has found to best meet this requirement of great sensibility through sluggishness of action, is of the Weston moving coil type. It has very high resistance and has an electromagnet producing an extremely intense field in place of the permanent magnet of the usual Weston instrument. This method of effecting a call, which involves the integrating of the energy of the received current over a relatively long period of time by the use of a receiving device, extremely sluggish in its response, is imported from radio-telegraphy, where it was first used by the German company, the Gesellschaft für Drahtlose Telegraphie of Berlin. Experiments have not yet, so far as the author is aware, shown whether it is possible to operate this selective call over as great a length of line as it is possible to telephone or to telegraph at ordinary speed with a current of the same frequency but the promise is good.

A great advantage enjoyed by the new high frequency telephone system over the existing system is in the important particular of distortion. In the existing system of telephony, the currents as they are propagated along the line suffer a continual attenuation or a loss of amplitude, an effect to be minimized as far as possible. Still more harmful, however, in general, is the distortion of the telephone current which it engenders through the fact that the component alternating currents of different frequencies which make up the telephone current are unequally attenuated. Usually, therefore, long before a telephone current has been attenuated to a point at which it is too feeble to be of use, it has been so far distorted as to be incapable of producing intelligible speech at the receiver. In other words, considerably more attenuation than is now tolerable could be permitted in telephone systems were it not for the distortion that usually accompanies it.

In the new high frequency system of telephony, attenuation, though greater than in the older system, brings with it no distortion whatever. There is, in fact, in the transmission of a given message, but a single frequency of current involved and therefore no unequal attenuation of components of different frequencies and no distortion.

Another signal advantage of the new high frequency telephone system over the existing system lies in the silent line[18] which it enjoys. Were it not for the noisiness of the average telephone line in the existing system, telephone receivers of far greater sensibility could be used with advantage. Furthermore, a much fainter transmitted speech would be easily understood and even prove more acceptable to the telephone subscriber than the louder transmission does on the average telephone line today. In the new telephone system, telephone receivers of several thousand ohms are used, having correspondingly greater sensibility than the low resistance receivers in use in the existing telephone system.[19] Moreover, transmitted speech which is so faint that it would be completely swamped and ineffective on even a moderately noisy line is heard and understood against a background, as it were, of absolute silence.

[17]See record for Stone, Pupin, and Hutin & LeBlanc in interference in the U. S. Patent Office No. 17,196.

[18]The receivers in the new system are not only unaffected by the usual cross talk or induction between adjacent telephone circuits, and by inductive disturbances generally, that so often cause confusing noises in the receivers of the existing telephone system, but they are, moreover, mute to their own transmitters. In other words, there is no so-called side tone, and the user of the system speaks as loudly as he pleases into his transmitter without deafening himself by hearing the sound of his own voice rasping in his own telephone receiver, as so often happens in the existing system.

[19]The sensitiveness of a telephone receiver is approximately proportional to the square root of the resistance of its windings. In connection with the centralized energy systems in the United States, telephone receivers of from 20 to 60 ohms are used. The telephone receivers employed in the new high frequency system are of 2,000 ohms resistance.

(To be continued.)

The Telephone Inspector and the Troubleman

The Tenth Installment of a Series of Articles Which Deals in an Elementary Manner With Many of the Problems Encountered in the Operation of Small Exchanges—Laylng Out the Pole Line Over a Hill

By A. E. Dobbs

When the men arrived at Buck Creek and laid out the line, using the double pole frame construction, they found that it would take a 220 ft. span to cross the creek and have a safe place for the pole on the high bank opposite.

"Set a stake here," George directed Will, as he looked over

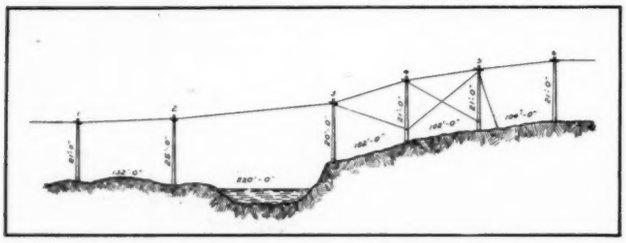

Fig. 20. Holding a Hill Line and Adjusting Distances.

the ground. "Now this stake is only 44 feet from where the next pole ought to be, but as that is not a transposition pole, we will divide the distance between three other sections. I will make a diagram of it right now. Here it is (Fig. 20). Your next section will be 102 feet and the same distance on the next, while the third section, between poles Nos. 5 and 6, is 104 feet in length. That brings No. 6 in just the right place so that the rest of the poles will come the regular spacing of 132 ft.

"Since we are talking about this part of the line, we will make use of head guys (Fig. 21) on this hill. This is done in order to hold the extra weight of wire, which is always pulling downward on a steep hill, so that if a sleet storm breaks down a section beyond the poles will not be dragged down hill out of the perpendicular. Also put a cross guy between poles Nos. 4 and 5 so that if the wires on the hill should break, all of the slack will not be pulled to the top of the hill. We will also put cross guys every mile apart on this line as a protection against possible breakdowns.

"I see," he continued, "that there are signs of an outcropping ledge of rocks between poles Nos. 3 and 5 so that it is possible that we may have to dig two or three of the holes with dynamite. If so, we can probably get rock enough to fill in around the double pole No. 2, as that is right on the bank of the stream and must withstand the force of a considerable current when the water is up during flood times. The rock in this case is merely to prevent the possibility of the poles being undermined and washed out.

"Here we have a slight curve in the line and we will use braces like that shown in this sketch (Fig. 22 *A*). They can be set on the field side as we have not yet got back to our original distance of one foot from the fence line. If the curve had been in the other direction we might have used the slug or anchor guy, something like the one shown by this drawing Fig. 22*B*). Personally, I believe in the use of patent guy anchors such as are advertised in TELEPHONY. The patent anchors can be used in practically all cases where guying must be done and they have many advantages over the log or 'dead man' anchors."

The next forenoon they arrived at the town limits of Northville. George went ahead to meet Mr. Black, the superintendent of the long distance line, and to discuss with him various matters relating to construction. The superintendent insisted that the line transpositions should have started at the Northville end instead of from Independence. George argued that the transpositions were perfectly regular and that main line conditions did not exist on a spur line anyhow and pointed out that two or more extra transpositions would have to be made in the town anyhow. The superintendent yielded the point and went out with George to help locate the line within the town limits.

Just as they finished staking it out Mr. Risk drove into town. At his invitation the superintendent went back over the line with them, making a note of everything he saw and asking numerous questions. The "A" frame layout of the six poles at Buck Creek marsh interested him. After he learned all the reasons for this mode of construction, he remarked that it was a new idea to him. He said he intended making a note of it for future reference and would try to have the method written into the specifications of his company.

"Still," he said, "I notice that there was considerable rock removed in building this road up that hill and it seems to me that you could have obtained rock enough from that cut to have met your requirements. No one would have objected to your making that cut a little wider and you could have used single poles, but I will admit that, even at that, the double pole construction is the best."

"You have answered your own objection," spoke up George.

The boom attachment on the wagon interested him and as the teamster was just then engaged in throwing in the poles, he stopped to watch the work.

"I don't believe that you save much time by that arrangement," he remarked, "still those men are planting the poles at the rate of one every five minutes or twelve an hour. That is pretty quick work, although it will take five men to straighten them up."

"True enough," responded George, "but then it would take six men to pike them in and they could not have piked them in at the rate of twelve an hour. You must also remember that we have not an experienced gang as you have where every man knows his place and just what is expected of him."

Arriving at Independence Mr. Black made note of the plan laid out for bringing the wires into the exchange. He suggested transposition plans for the town part of the line but

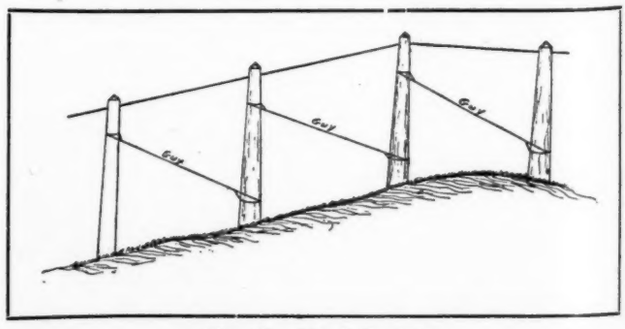

Fig. 21. Head Guying.

found George already had the same ideas in mind. After completing the inspection he finally congratulated both George and Mr. Risk upon the work as laid out.

"However," he continued, "as you have a common return system here, you will need repeating coils for every cord cir-

cuit to connect to the metallic toll circuit. I should strongly advise you to install a toll line board for the purpose of taking care of these calls and place it in charge of a special operator. Let me see, you will have about twelve toll line circuits when these two lines are completed. It would be best to order a 20-line board, so arranged that when you change over your system to common battery as you will have to do soon, the toll board will not have to be replaced. This is really none of my business, however, as that matter lies between you and the officials of my company.

"At present, of course, you obtain satisfactory results by connecting your short toll lines to the ordinary switchboard drops but you will find it different when you really get into long distance talking.

"Well, my train is due in 15 minutes, and I must go back to my gang."

As George walked with him to the station, Mr. Black said: "I came down here expecting to be able to tell you fellows something but it seems that you need no telling and have given me one or two ideas, besides."

"The ideas really belong to Mr. Risk in this case," replied George, "for all I did was to reduce them to a working basis. I sometimes think that construction linemen are too conservative in adopting or inventing new methods of work. For example: They continued to use the old fashioned vise and jack-strap for making connections and pulling up wire, long after connectors and eccentrics were invented, although both of these tools are lighter and much more convenient to work with. It was the new men coming into the field who really secured their general adoption. Then, we still use the digging bar, long handled shovel and spoon, when in most soils, a post hole auger saves half the time. I see no reason why such an auger of large size, say 12 inches or 14 inches in diameter should not be attached to the boom of a wagon, driven along over the route and still more time saved in construction. I believe that at least ten holes an hour could be put down by the use of such a contrivance, which after all, is the plan used by well diggers in some parts of the country. Some of the very large companies do have automobile trucks with such arrangements but our work would not warrant them.

"We still spend a great deal of time framing and gaining poles which could be saved by fastening the arms to the poles by two light bolts and an iron strap on the back side or by a patent gain which would allow us to shift the arms into any position. Then we pike poles into the holes, a risky

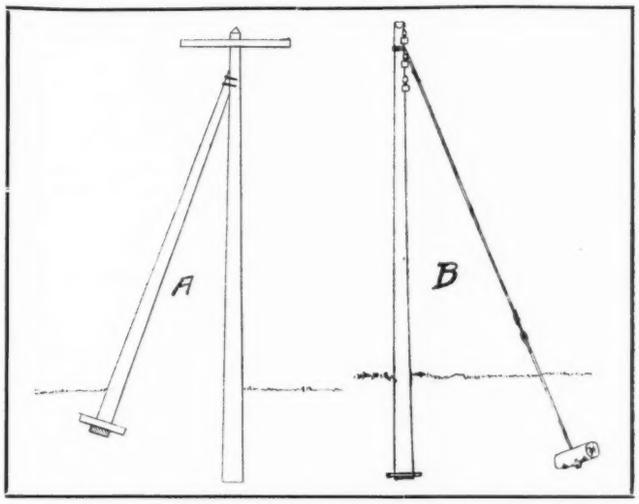

Fig. 22. The Push Brace and the Anchor Guy.

occupation even with an fairly experienced gang, when a derrick wagon which could be purchased by one company and sublet to other companies when not needed at the home exchange, would be safer and quicker.

"Now, many of these improvements were invented by people with very little or no experience in actual line construction. There are still others that might be made to the advantage of everyone concerned and we, who are in the business, should be leaders in this class of work."

Just then the train pulled in and the two men parted.

Of course, Mr. Risk was elated at the approval of the long distance man but George, who was used to superintendents and engineers and knew his own ability, had little to say on the subject but at the same time he was glad to notice the increased respect with which the manager treated him.

(*To be continued.*)

From Factory and Salesroom

A Busy Year for 1913 Predicted.

"Ironite orders are numerous these days," advises Mr. Macduff, of Paragon Sellers Co., of Chicago. But he is especially pleased with the new accounts being booked and attributes them to the fact that wherever Ironite is used it invariably satisfies. Ironite is not the company's only speciality enjoying good demand. The Paragon ground cone, the Paragon battery box and Paragon porcelain self-tying knobs are being ordered by many telephone men.

Mr. Macduff studies the telephone situation thoroughly, is constantly circularizing the field, and advises that reports which he receives indicate that next year in the telephone field is going to be a busy one. This company is doing quite an export business. Samples, particulars, etc., of any of the above specialties will be mailed gladly upon request.

New Southern Electrical Jobbing House.

The Binford Electric Co. has just been incorporated at Richmond, Va., Julien Binford becoming its president and treasurer. Mr. Binford was for seventeen years secretary of the Tower-Binford Electric & Mfg. Co., of Richmond. He severed his connection with that organization some time ago, not intending to re-enter the field. Circumstances, however, appearing to favor his remaining in Richmond and not giving up his former line, the present organization resulted.

New quarters are now being fitted up, having over 20,000 square feet of floor space. A general line of electrical supplies will be carried, the territory to be covered including Virginia, North Carolina, South Carolina and portions of Tennessee, Kentucky and Georgia.

Although capitalized at only $50,000, the company is said to have substantial backing and to be prepared to do a large amount of business. This will be done with jobbers only, no retail trade being solicited. Agreements, it is said, have already been closed with some of the largest manufacturers in the country and the company expects to be doing business by the fifteenth of the month.

Another New Kellogg Man.

Carl M. Bowling, the latest addition to the Kellogg company's staff of salesmen, was born in Fountain county, Indiana in 1882. He assisted his father on the farm during the summer, attending the country school in the winter.

At the age of 18 years, he began his telephone career by doing construction work for the Shawnee Telephone Co., located in his home county. He afterwards became line-

man for this company, in which he has been a stockholder since its organization.

After four years of service with the Shawnee Mr. Bowling went to Hoopeston, Ill., where he secured a position with E. J. Boorde, owner and manager of the Hoopeston Telephone System. Not long after starting

Carl M. Bowling.

with this company, he became wire chief. He held this position for more than seven years, resigning to take a position with the Kellogg Switchboard & Supply Co., of Chicago, as traveling salesman.

While working in Hoopeston, Mr. Bowling was largely instrumental in developing the system from a common return magneto to a full metallic system with a common battery multiple board.

Mr. Bowling's territory consists of western Indiana and eastern Illinois, with headquarters for the present at Hoopeston, Ill. His many friends extend congratulations and hope for a continued success in his new field of labor.

Paragraphs.

JOHN W. COFFEY, head of the Coffey System & Audit Co., of Indianapolis, is this week installing his special system for telephone companies at Maryville, Mo. The Hanamo Telephone Co., with headquarters there, having examined the various accounting plans on the market, has concluded that the Coffey system cannot be beaten.

J. C. MURRAY, sales engineer of the Kellogg Switchboard & Supply Co., Chicago, left last week on a world's tour in the furtherance of Kellogg Independent telephone equipment. Mr. Murray wishes to be remembered to his many friends in the telephone field. While he would have liked to call on all of them in person, on account of his limited time, he was able to see but few.

THE INDIANA STEEL & WIRE CO., of Muncie, Ind., is mailing an interesting and well-worth-reading folder to the trade. It is put up in the form of a private mailing card, of large dimensions, folded twice. Four pages are given up to a description of the process of various tests of the company's product. Two are filled with letters from satisfied users in the field. The matter is instructive and should be in the hands of any manager contemplating the purchase of wire.

THE QUEEN-GRAY CO., of Philadelphia, has purchased the business of Queen & Co., Inc., including the name, good will, patents, machinery, stock in trade and assets in general. The new company will continue the business in engineering, electrical and scientific instruments, at 618 Chestnut street and 611 Sansom street. All accounts due Queen & Co., Inc., dated previous to October 15, are payable to W. P. Barrows, trustee, 618 Chestnut street. All accounts dated October 16 and thereafter are payable to Queen-Gray Co.

THE STROMBERG-CARLSON TELEPHONE MFG. CO., of Rochester, N. Y., did some excellent work in repairing the ravages of the fire at Peoria, Ill., recently mentioned in TELEPHONY. On the day of the fire, the company shipped multiple switchboard equipment to replace that which was burning, as well as cable and other material. Because of this prompt attention, the Inter-State company was able to make a quick recovery and give service again within a very short time.

The Stromberg company reports business in general as very good. It has recently received three contracts for multiple switchboards, one at Grinnell, Iowa, one at Carlinsville, Ill., and one at Thief River Falls, Minn.

Amphibious Telephones.

A trade mark is not always true in all that it says. For instance, "Wear Like Iron" shoes do not really wear like iron, and no one expects that they will. However, when the Ericsson Mfg. Co., of Buffalo, adopted "Everlasting" as the trade name for its steel telephones, it selected a name which was really descriptive and true.

The Hickman Independent Telephone Co., of Hickman, Ky., had several telephones under water for over three weeks last spring, during the severe floods there when the Ohio River overflowed its banks, and, although the wooden telephones had all gone to pieces, the Ericsson Steel Telephones were simply dried out, cleaned and again put in service, without a new part being supplied.

Of course, these were very unusual tests for a telephone, but if steel telephones will work after such ravages of the

Ericsson All Steel Telephones, Unharmed by the Flood.

elements they should be perfect under normal conditions. Incidentally, in flood times it's no easy thing to get telephones or anything else across the Ohio, and so it is a matter of no little moment to Kentucky and western West Virginia telephone men to know that they can get Ericsson telephones of all kinds and supplies of every description from the stock carried by Harry I. Wood Co., 517 West Main street, Louisville, the exclusive Ericsson agent in that territory.

Legal Cases and Decisions

By A. H. McMillan

Exclusive Connection Contract Held Valid.

The Pacific Telephone & Telegraph Co. operates exchanges in and near all the cities and towns of the state of Washington, and has long distance toll lines connecting practically all of such cities and towns. October 13, 1903, the town of Newport passed an ordinance granting the company a franchise. Subsequently the property of the company in the town, exclusive of the franchise, was sold to one Craig and later by him to one Anderson, who entered into a toll line contract with the company.

In the contract, Anderson agreed that he would not, during the period of the agreement, extend his toll line or establish any exchange or exchanges outside of his territory or connect with any toll lines, exchange or exchanges, either within or without said territory, other than those of the Pacific company and its allied companies, without the consent in writing of the Pacific company. The Pacific company on its part agreed that it would not connect with any exchange or toll lines in the territory in competition with those of Anderson. It was also provided that the company and Anderson would exchange business, and each party, so far as it might lawfully do, would turn over to the other all telephone and telegraph business which it might be able to obtain or direct to points on the lines of other parties. The charge for communications passing lines of both parties was to be the tolls of the Pacific company added to the tolls of Anderson.

Anderson subsequently sold the exchange to an agent or trustee for the Interstate Telephone Co., Ltd., or the Home Telephone & Telegraph Co. The Interstate company took possession of the exchange and, in violation of the contract, sent business over its own toll lines and those of the Home Telephone & Telegraph Co. of Spokane, Wash. The Pacific company sought an injunction to restrain such connections. It was urged that the provisions were contrary to public policy and void.

The first ground in support of such contention was that each party had by the contract disabled itself from performing fully its functions as a common carrier. The court in overruling this contention admitted that such companies are common carriers and must give the same service on the same terms to all who apply therefor, without partiality or unreasonable discrimination, but that each telephone company is independent of all other telephone companies, except as to the duty to receive and forward to any point on its lines messages received from such other company or companies; hence that is not bound to accord to any such outside organization connections with its switchboards on an equality with its own subscribers.

It was also contended that the agreement was void because each party made physical connection with the other; hence was bound to grant the same privileges to any other company on the same terms. The court overruled this contention, holding that where a public service corporation entered into private contracts with others in furtherance of its business, there was no warrant for holding that its public duties are in all cases extended to the full scope of the private contract.

Other provisions of the contract were attacked on the ground that they tended to create a monopoly, but these provisions were held to be separable from the rest of the contract and the court deemed it unnecessary to consider them. They were found similar to the provisions of the Western Union contract involved in Union Pacific Railway Co. vs. United States, 59 Federal, 813. Pacific Telephone & Telegraph Co. vs. Anderson, 196 Federal, 699.

Use of Rubber Gloves.

In an action against an electric company and a telephone company for the death of a lineman, a verdict was rendered against the electric company in favor of the telephone company. Among the facts it appeared that the companies under a joint arrangement used for their wires a certain pole; that on the day of the accident there was attached to the pole a double steel or copper wire extending from the telephone wire downward to within about six feet of the earth and formerly used as a ground wire; that this wire had been abandoned for years and there was no indication that it had any ground connection; that a guy wire was in contact with this abandoned wire, thus furnishing it a ground connection at a point about 100 feet distant from the pole; that the connections thus made, forming a ground or metallic circuit with the earth, were so hidden that they were not open to observation and the lineman in question did not have any notice or knowledge of them; that at the time of the accident the lineman ascended the pole by use of his climbers and began the work of taping or repairing the wires; that while so engaged one of his climbers came in contact with the abandoned ground wire, which, in connection with the guy wires, formed a circuit, through which he received from the electric light wires, an electric shock which caused his death.

One of the grounds upon which the electric company asked that the verdict for the plaintiff be reversed, was that he had among his tools a pair of rubber gloves, which are non-conductors of electricity, and that his failure to wear these gloves contributed to his death. It was made clear in the case that under "certain conditions" it is dangerous to handle electric wires without wearing such gloves, but it was not shown whether such conditions were present and known to the lineman, or could have been known to him by the exercise of ordinary care at the time he undertook to tape the wires. Hence the contention of the electric light company was overruled. Miriam Light & Heating Co. vs. Vermillion, 99 N. E., 55.

Providing for Preferred and Common Stock.

The California Telephone & Iight Co. was compelled to secure a writ of mandate to force the secretary of state of California to accept the filing of a certified copy of the amended articles of incorporation of the company. The ground of the secretary's refusal was that there was not attached to such articles, a copy of the certificates of acknowledgment which were attached to the original articles of incorporation. The attorney general in representing the secretary of state in the case, made the additional defense that the amended articles, in violation of law, attempted to increase the capital stock of the company. On the first point the court held that the certificates of acknowledgment by law are impliedly excluded as a necessary part of the articles.

The original articles of incorporation provided for a capital stock of $10,000,000, divided into 100,000 shares of the par value of $100 per share. By the amendment the same number of shares was divided into two classes, preferred and common stock, 40,000 shares being preferred stock and the remaining 60,000 shares common stock. Previous to such amendment the capital stock of the company was not so divided or classified. Section 362 of the civil code provided that nothing in the section should be construed to authorize any corporation to increase or diminish its capital stock.

The attorney general contended that this prohibited the amendment. The court held that this contention was not sound because the mere act of classifying capital stock, without changing the number of shares, could not be held to be in any sense tantamount to reducing or increasing such stock. California Telephone & Light Co. vs. Jordan, 126 Pacific, 598.

Suit for Defective Service Fails.

Pursuant to a contract between the New York Telephone Co. and Joseph Simon, the company maintained a telephone station and furnished telephone service to him during 1910, including some toll service. The company brought suit against him, alleging that payment had been made only for the first quarter and the toll service.

An answer was filed admitting the making of the contract. It alleged as a reason for not paying that the service was defective and of no value whatever, and that the subscriber could not use it.

The court decided for the telephone company because the subscriber had not set forth any facts to show wherein the service was defective and of no value. The court humorously said: "The remaining statement in the 4th paragraph, that defendant could not use the same is equally bad. For all that appears, it may have been because he was deaf and dumb. It does not say why." 137 New York State, 542.

Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued, and Any Items of Interest as to Their Plants and Systems

Personal.

T. H. LEMIRE has succeeded R. J. Barnes as manager for the Michigan State Telephone Co., at White Cloud, Mich.

W. H. WILSON, has severed his connections with the American Union Telephone Co., of Philadelphia, Pa., and has taken charge of the Union Telephone Co., of Erie, Pa.

J. HERON CROSMAN, JR., of Harrisburg, Pa., has been appointed general commercial superintendent of the Bell Telephone Co., of Pennsylvania, with headquarters in Philadelphia.

J. H. KEATING, of Janesville, Wis., who has been employed in the collection department of the local branch of the Wisconsin Telephone Co., has been appointed manager of the plant at Mayville, Wis.

J. E. PASSWATER of Colorado has been appointed manager of the Mountain States Telephone & Telegraph Co., at Brigham, Utah, to succeed John E. Baird, resigned. Mr. Baird has served as manager for fifteen years.

LEONARD H. KINNARD, of Philadelphia, has been elected to the office of second vice-president and general manager of the Bell Telephone Co., of Pennsylvania succeeding Philip L. Spaulding, recently elected president of the New England Telephone & Telegraph Co. Mr. Kinnard has been connected with the Bell companies in Pennsylvania for the past 24 years holding responsible positions the last 16 years. With the consolidation of the Pennsylvania companies in 1908 he became general contract agent and later was made general commercial superintendent of the several Bell companies having headquarters in Philadelphia.

Obituary.

C. P. WAINMAN, vice-president and general manager of the Northwestern Telephone Exchange Co., and a wealthy resident of Minneapolis, died suddenly at his hunting lodge near Maine, Minn. He was a veteran of the civil war and well known in Minnesota G. A. R. circles.

New Companies.

FAIRFAX, IOWA.—The Fairfax Mutual Telephone Co. has been incorporated with a capital stock of $10,000. W. H. Shank is president; J. F. Listebarger, secretary, and George Storey, treasurer.

HAWESVILLE, KY.—John Webb, Frank Gaynor, G. F. Lancaster and others are organizing a telephone company to build a line connecting Hawesville with the county seat.

OWENSBORO, KY.—The farmers in the utility section have organized a rural telephone company and will begin in a short time to build a line to Hawesville; the promoters of the proposition are: John Webb, Frank Gaynor, S. B. Marsch, G. F. Lancaster, Ed Wroe, W. S. Gibbs, J. D. Chambers and R. K. Blake.

LYND, MINN.—The Lynd Farmers' Telephone Co. has been chartered with $5,000 capital stock. The incorporators are W. Banks, S. Nichalson and A. A. Sharratt.

MILACA, MINN.—The farmers of Bock have formed the Bock Rural Telephone Co., with $15,000 capital stock.

PLAZA, MINN.—O. H. Tracy is the head of a movement to establish an extended rural telephone system.

PEASE, MINN.—Articles of incorporation have been filed by the Farmers and Merchants Rural Telephone Co. The officers are G. Mohreneiser, president; J. Harr, vice-president, and C. A. Peterson, secretary-treasurer. The capital stock is $5,000.

PRINCETON, MINN.—The Blue Hill Rural Telephone Co. has been incorporated. The company will build about twenty miles of line.

RAY, N. D.—Articles of incorporation have been filed by the Williams County Mutual Telephone Co. The incorporators are: Herman A. Nelson, Philip K. Everson, Rudolph Hoel and Geo. H. Moellring, all of Ray, and Nels Kamp, of Hofflund. The capital stock is $10,000.

CAMP CROOK, S. D.—The Camp Crook & Buffalo Telephone Co. has been incorporated with $5,000 capital stock. The incorporators are William Fried, Buffalo; Fred W. Wilson, Buffalo; L. A. de Belloy, Camp Crook, and C. T. Martin, Camp Crook.

BRANDON, VA.—The Brandon Telephone Exchange has been chartered with $5,000 capital stock. The officers are: J. T. Deal, president, Norfolk; R. C. Harrison, vice-president, Savannah, Ga.; F. Otway Byrd, secretary-treasurer, Brandon, Va.

MOOSEJAW, SASK., CANADA.—The Grand View Rural Telephone Co. has been chartered with $1,000 capital stock.

STRASSBURG STATION, SASK., CANADA.—The Mountain Side Rural Telephone Co. has been organized with $800 capital stock.

Construction.

RANSOM, ILL.—The Farmers' Telephone Co. will build a new toll line to Kinsman.

SIDNEY, IOWA.—The Mutual Telephone Co. will extend its lines.

WHITESBURGH, KY.—Work is to be started at once on a local and long-distance telephone line from this city via Sergent and Moneberts to Jenkins, the new city on Elk Horn. The Whitesburgh Telephone Co. is at the head of the project.

MAHNOMEN, MINN.—The line between this place and Detroit is to be repaired and partially rebuilt by the Becker-Mahnomen Telephone Co.

SPRINNGFIELD, MINN.—The Tri-State Telephone & Telegraph Co. is preparing to extend its lines as far west as Brookings, S. D.

THIEF RIVER FALLS, MINN.—The Tri-State Telephone & Telegraph Co. will build a $30,000 telephone exchange here.

FREMONT, NEB.—The Farmers' Telephone Co. has voted to make extensive additions to its lines and to erect buildings in North Bend and Scribner.

WILTON, N. D.—Oscar Backman and Gabriel Thor have built a telephone line to this city and propose to form a company to extend it.

NYSSA, ORE.—The Malheur Home Telephone Co. is to reconstruct some of its lines and will also build some extensions.

MIKANA, WIS.—The farmers about Mikana are contemplating building a line and are inquiring for poles.

NELSON, B. C. CANADA.—The federal government will build a telephone line between Nelson and Waneta.

Financial.

LINCOLN, NEB.—The railway commission has authorized the Bloomington Valley Telephone Co. to issue $8,000 of stock for the purchase of the exchange of the Republican Valley Telephone Co. at Bloomington.

WYMORE, NEB.—The Wymore Independent Telephone Co. has declared a 5 per cent. dividend and a 2 per cent. reserve fund.

NEW FRANKEN, WIS.—The New Franken Telephone Co. has filed an amendment to its charter, increasing the capital from $5,000 to $10,000.

Franchises.

SANTA CRUZ, CAL.—R. K. Dickson has applied for a franchise for a telephone line in the Larkin Valley and the San Andreas districts.

RIALTO, CAL.—Bids will be received up to December 3 for a franchise to transmit electricity for telephone and telegraph purposes along the public thoroughfares of this city.

MODESTO, CAL.—The petition of the Evans Telephone Co. for permission to place and maintain poles and wires over and along the highways in the vicinity of Patterson, has been granted.

VACAVILLE, CAL.—H. G. Brown and associates have been granted permission to maintain a telephone line between Dixon and Maine Prairie.

RUSHVILLE, ILL.—The city council has granted a franchise to the Schuyler Telephone Co., recently organized. The new organization has entered into an agreement to purchase the local exchange owned by L. A. Jarman and B. O. Willard.

RENO, NEV.—The Sierra Telephone & Telegraph Co. has applied to the county commissioners for permission to erect and operate a telephone system in Washoe county.